Continued From Front

IV. REMEDIAL ACTIONS

A. SHORT TERM/EMERGENCY ACTIONS *(On Site and Off-Site)*: List all emergency actions taken or planned to bring the site under immediate control, e.g., restrict access, provide alternate water supply, etc. See instructions for a list of Key Words for each of the actions to be used in the spaces below.

1. ACTION	2. ACTION START DATE (mo, day, & yr)	3. ACTION END DATE (mo, day, & yr)	4. ACTION AGENCY (EPA, State, Private Party)	5. COST	6. SPECIFY 311 OR OTHER ACTION: INDICATE THE MAGNITUDE OF THE WORK REQUIRED.
				$	
				$	
				$	
				$	
				$	
				$	

B. LONG TERM STRATEGY *(On Site and Off-Site)*: List all long term solutions, e.g., excavation, removal, ground water monitoring wells, etc. See instructions for a list of Key Words for each of the actions to be used in the spaces below.

1. ACTION	2. ACTION START DATE (mo, day, & yr)	3. ACTION END DATE (mo, day, & yr)	4. ACTION AGENCY (EPA, State Private Party)	5. COST	6. SPECIFY 311 OR OTHER ACTION: INDICATE THE MAGNITUDE OF THE WORK REQUIRED.
				$	
				$	
				$	
				$	
				$	
				$	

C. MANHOURS AND COST BY ACTION AGENCY

1. ACTION AGENCY	2. TOTAL MAN-HOURS FOR REMEDIAL ACTIVITIES	3. TOTAL COST FOR REMEDIAL ACTIVITIES
a. EPA		$
b. STATE		$
c. PRIVATE PARTIES		$
d. OTHER *(specify)*:		$

B-3

CYANAMID

American Cyanamid Company
600 N. Jones Street
Fort Worth, Texas 76106

June 1, 1981

CERTIFIED MAIL
RECEIPT REQUESTED

Sites Notification
Region VI
U.S. Environmental Protection Agency
Dallas, TX. 75270

RE: American Cyanamid Company
Fort Worth Plant

Dear Sir:

Enclosed please find the completed Notification of Hazardous Waste Site (EPA Form 8900-1) as required by Section 103 of the Comprehensive Environmental Response, Compensation, and Liability Act (Superfund).

This submittal and any past or future discussion or communication with respect to this matter is not intended to admit any liability or to waive or affect any rights.

Very truly yours,

H. Mitchell
Acting Plant Manager

RT:cr
Enclosure

TXS-000-001-470

SS
8-6-81

Withdrawn
Aug 4, 1981 - See attached CM

Environmental Protection Agency
Washington DC 20460

This initial notification information is required by Section 103(c) of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 and must be mailed by June 9, 1981.

Please type or print in ink. If you need additional space, use separate sheets of paper. Indicate the letter of the item which applies.

A Person Required to Notify:

Enter the name and address of the person or organization required to notify.

Name: American Cyanamid Company
Street: One Cyanamid Plaza
City: Wayne State: N.J Zip Code: 07470

B Site Location: TXD00-801-7261

Enter the common name (if known) and actual location of the site.

Name of Site: Fort Worth Plant
Street: 600 N. Jones Street
City: Fort Worth County: Tarrant State: TX. Zip Code: 76106

or HA2-TX01093

C Person to Contact:

Enter the name, title (if applicable), and business telephone number of the person to contact regarding information submitted on this form.

Name (Last, First and Title): Mitchell, H. Acting Plant Manager
Phone: (817) 332-2127

D Dates of Waste Handling:

Enter the years that you estimate waste treatment, storage, or disposal began and ended at the site.

From (Year): 1942 To (Year): 1972 *

* Disposal site of interest closed in 1972.

E Waste Type: Choose the option you prefer to complete

Option 1: Select general waste types and source categories. If you do not know the general waste types or sources, you are encouraged to describe the site in Item I—Description of Site.

General Type of Waste:
Place an X in the appropriate boxes. The categories listed overlap. Check each applicable category.

1. ☐ Organics
2. ☐ Inorganics
3. ☐ Solvents
4. ☐ Pesticides
5. ☐ Heavy metals
6. ☐ Acids
7. ☐ Bases
8. ☐ PCBs
9. ☐ Mixed Municipal Waste
10. ☐ Unknown
11. ☐ Other (Specify)

_____
_____
_____

Source of Waste:
Place an X in the appropriate boxes.

1. ☐ Mining
2. ☐ Construction
3. ☐ Textiles
4. ☐ Fertilizer
5. ☐ Paper/Printing
6. ☐ Leather Tanning
7. ☐ Iron/Steel Foundry
8. ☐ Chemical, General
9. ☐ Plating/Polishing
10. ☐ Military/Ammunition
11. ☐ Electrical Conductors
12. ☐ Transformers
13. ☐ Utility Companies
14. ☐ Sanitary/Refuse
15. ☐ Photofinish
16. ☐ Lab/Hospital
17. ☐ Unknown
18. ☐ Other (Specify)

_____
_____
_____

Option 2: This option is available to persons familiar with the Resource Conservation and Recovery Act (RCRA) Section 3001 regulations (40 CFR Part 261).

Specific Type of Waste:
EPA has assigned a four-digit number to each hazardous waste listed in the regulations under Section 3001 of RCRA. Enter the appropriate four-digit number in the boxes provided. A copy of the list of hazardous wastes and codes can be obtained by contacting the EPA Region serving the State in which the site is located.

P120		

Form Approved
OMB No. 2000-0138
EPA Form 8900-1

F **Waste Quantity:**

Place an X in the appropriate boxes to indicate the facility types found at the site.

In the "total facility waste amount" space give the estimated combined quantity (volume) of hazardous wastes at the site using cubic feet or gallons.

In the "total facility area" space, give the estimated area size which the facilities occupy using square feet or acres.

Facility Type

1. ☐ Piles
2. ☐ Land Treatment
3. ☐ Landfill
4. ☐ Tanks
5. ☐ Impoundment
6. ☐ Underground Injection
7. ☐ Drums, Above Ground
8. ☒ Drums, Below Ground
9. ☐ Other (Specify) _____

Total Facility Waste Amount

cubic feet _____

gallons 25 to 50 55 gal. drums

Total Facility Area

square feet 27,000

acres _____

G **Known, Suspected or Likely Releases to the Environment:**

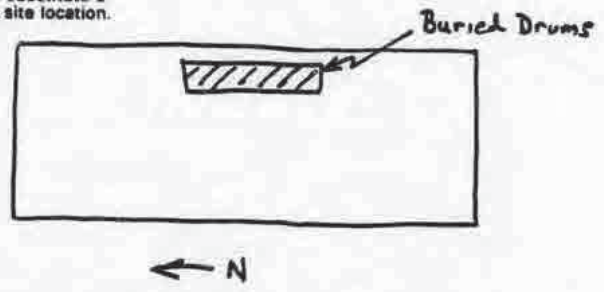
Place an X in the appropriate boxes to indicate any known, suspected, or likely releases of wastes to the environment.

☐ Known ☐ Suspected ☐ Likely ☒ None

Note: Items H and I are optional. Completing these items will assist EPA and State and local governments in locating and assessing hazardous waste sites. Although completing the items is not required, you are encouraged to do so.

H **Sketch Map of Site Location:** (Optional)

Sketch a map showing streets, highways, routes or other prominent landmarks near the site. Place an X on the map to indicate the site location. Draw an arrow showing the direction north. You may substitute a publishing map showing the site location.



I **Description of Site:** (Optional)

Describe the history and present conditions of the site. Give directions to the site and describe any nearby wells, springs, lakes, or housing. Include such information as how waste was disposed and where the waste came from. Provide any other information or comments which may help describe the site conditions.

Reported area believed to contain 25 to 50 partially filled drums of vandium - containing catalyst. Area was previously reported to EPA (H. Mitchell/ D. Dutton, 4/3/81)

J **Signature and Title:**

The person or authorized representative (such as plant managers, superintendents, trustees or attorneys) of persons required to notify must sign the form and provide a mailing address (if different than address in item A). For other persons providing notification, the signature is optional. Check the boxes which best describe the relationship to the site of the person required to notify. If you are not required to notify check "Other".

Name American Cyanamid Company

Street 600 N. Jones Street

City Fort Worth State TX. Zip Code 76106

Signature H. Mitchell Date 6/5/81

H. Mitchell, Acting Plant Manager

☒ Owner, Present
☐ Owner, Past
☐ Transporter
☐ Operator, Present
☐ Operator, Past
☐ Other

B-4

CYANAMID

American Cyanamid Company
600 North Jones Street
Fort Worth, TX 76106
(817) 332-2127

RECEIVED
AUG 19 1981
S & A DIVISION

August 4, 1981

CERTIFIED MAIL
Return Receipt Requested

Sites Notification
Region VI
U. S. Environmental Protection Agency
1201 Elm Street
Dallas, TX 75270

Re: **American Cyanamid Company**
Fort Worth Plant

Dear Sir:

Cyanamid submitted a Notification of Hazardous Waste Site (EPA Form 8900-1) on June 1, 1981 based on an on-site inactive disposal area which we believed to contain RCRA hazardous waste. Subsequent review of this situation, however, indicates that the waste disposal in this area is not RCRA hazardous and we, therefore, wish to withdraw our Notification.

In option 2 of Item E and items F, G, H and I, we specifically made reference to 25 to 50 partially filled buried drums believed to contain off-grade catalyst product contaminated with vanadium. This specific waste was included in the Notification on the basis of the vanadium pentoxide used in the production process and the waste was given the designation P-120, which denotes discarded vanadium pentoxide. Subsequent review of the RCRA regulations indicates that: (a) the waste is not pure or off-specification vanadium pentoxide and should not be designated as P-120, (b) waste from the on-site production process is not a listed hazardous waste (Sections 261.31 to 261.33), and (c) the specific waste does not have any of the 4 hazardous waste characteristics (Sections 261.21 to 261.24).

Based on these [redacted] request that our Superfund site Notification be withdrawn. Please advise if there are any questions.

Very truly yours,

Hershel J. Mitchell
Acting Plant Manager

/f

B-5

THE FERTILIZER INSTITUTE
1015 18th Street, N.W.
Washington, D.C. 20036

KARL T. JOHNSON
Vice President
Environmental Programs

(202) 861-4900
Telex: 89-2699

ELL ___ MH ___
DKL ___ WGS ___
CRS ___ ROG ___
BEB ___

JUN 26 1981

MEM ___ JSM ___
AAG ___ TMH ___
FCM ___ HEP ___
SEC ___ FILE ___

Copies: Penn
TABAKIN

TED HARRIS

JUL 2 1981

~~File~~ 1680.9.1
June 23, 1981

TO: Members, Phosphate Subcommittee
(Manufacturing Environmental Committee)

FROM: Karl T. Johnson

SUBJ: Status of Vanadium Catalyst

It has been brought to my attention by many of you that the vanadium containing catalyst used in sulfuric acid manufacture is commonly referred to as "vanadium pentoxide catalyst." As a result, there has been a great deal of interest expressed in the listing by EPA of vanadium pentoxide as a chemical product which would be considered a hazardous waste if discarded, or intended to be discarded. Therefore, in response to your interest, I am transmitting, for your information, an analysis of the applicability of the hazardous waste regulations to the vanadium catalyst used in sulfuric acid manufacture.

KTJ:lcr
Enclosure
a/s

LAW OFFICES
McKENNA, CONNER & CUNEO
1575 EYE STREET, N.W.
WASHINGTON, D.C. 20005
(202) 789-7500

WRITER'S DIRECT DIAL NUMBER
(202) 789-7682

June 22, 1981

Mr. Karl T. Johnson
The Fertilizer Institute
1015 18th Street, N.W.
Washington, D.C. 20036

Re: Catalyst Used in the Production of Sulfuric Acid

Dear Karl:

The Hazardous waste management regulations promulgated by the United States Environmental Protection Agency (hereinafter referred to as "EPA") on May 19, 1980 list "vanadium pentoxide" as a commercial chemical product which is regulated as a hazardous waste when discarded or intended to be discarded. "Vanadium pentoxide" is used as a raw material in the production of a catalyst employed in the manufacture of sulfuric acid. You have requested our analysis of whether, and under what circumstances, this catalyst would be regarded as a "hazardous waste" under EPA's current hazardous waste management regulations.

I. Conclusion

We have analyzed the facts that have been presented to us concerning the nature and use of the catalyst in question in light of the currently applicable hazardous waste management regulations promulgated by EPA pursuant to the Resource Conservation and Recovery Act (hereinafter referred to as "RCRA").

On the basis of this analysis we conclude that the catalyst is not among the various materials listed as hazardous wastes by EPA. Therefore, discarded catalyst currently would be regulated under the federal hazardous waste regulatory program only if it exhibited one of the four "characteristics of hazardous waste" established by EPA's hazardous waste management regulations.

II. Relevant Provisions of the Hazardous Waste Management Regulatory System

A. Identifying Wastes As "Hazardous"

An analysis of the regulatory status of the catalyst in question (hereinafter referred to as "vanadium catalyst") must begin with a review of the basic ground rules EPA has established for identifying which solid wastes are to be regarded as "hazardous" and, therefore, subject to regulation

under EPA's hazardous waste management system regulations (hereinafter referred to as "the Regulations").

The practical application of EPA's regulatory mechanism for identifying which solid wastes are "hazardous" can be extremely complex. Reduced to its basics, however, the EPA methodology requires two separate analyses. EPA has promulgated several "lists of hazardous wastes." These lists include both industrial process wastes and commercial chemical products that are regarded as hazardous wastes when discarded or intended to be discarded. In addition to promulgating these lists of presumptively hazardous wastes EPA has developed four "characteristics of hazardous waste." Any waste not listed as hazardous must be evaluated against both of these characteristics. A waste which meets any of the characteristics is also regarded as hazardous.

B. The Listing of Commercial Chemical Products As Hazardous Wastes

Among the lists of presumptively hazardous wastes promulgated by EPA are two lists of "commercial chemical products" that are regarded as either "acutely hazardous wastes" (40 CFR §261.33(e), 45 Fed. Reg. 33124, May 19, 1980) or "toxic" hazardous wastes (40 CFR §261.33(f), 45 Fed. Reg. 33126) when they are discarded or intended to be discarded. "Vanadium pentoxide"

is among the commercial chemical products included on EPA's list of "acutely hazardous wastes."

C. Regulatory Consequences of the Listing of a Commercial Chemical Product As an Acutely Hazardous Waste

The listing of any commercial chemical product, including vanadium pentoxide, as an acutely hazardous waste brings into play a number of the "hazardous waste identification" provisions of the regulations.

First, the chemical itself, as well as any off-specification variant of the chemical, when discarded or intended to be discarded, is a "hazardous waste" and must be handled in accordance with all applicable provisions of the hazardous waste management regulations (40 CFR §261.33(a) and (b), 45 Fed. Reg. 33124).

Second, the "special requirements for hazardous waste generated by small generators" established by 40 CFR §261.5, 45 Fed. Reg. 33120, are only applicable to acutely hazardous wastes generated in quantities less than one kilogram in any given month. Furthermore, quantities of less than one kilogram a month are subject to full regulation if generated by a person

who generates more than 1,000 kilograms of other hazardous waste during that month.

Third, certain materials related to an acutely hazardous commercial chemical product are also regulated as hazardous wastes. As originally promulgated on May 19, 1980, EPA's regulations identified as hazardous waste: (1) any container larger than 20 liters in capacity which held a commercial chemical product identified as an acutely hazardous waste unless the container had been triple rinsed or decontaminated by an equally effective procedure; (2) inner liners of such containers totalling ten kilograms in any month, unless similarly decontaminated; and (3) residue resulting from the clean-up of a spill of a commercial chemical product listed as an acutely hazardous waste and totalling 100 kilograms in any month (see 40 CFR §261.5(c), 45 Fed. Reg. 33120 and 40 CFR §261.33(c) and (d), 45 Fed. Reg. 33124).

On November 25, 1980 EPA revised and clarified certain of the regulations applicable to containers and inner liners which held commercial chemical products listed as acutely hazardous wastes (45 Fed. Reg. 78524). The November 25, 1980 regulations make it clear that EPA intended to regulate the

residue in containers and inner liners which are not "empty" and not the containers and inner liners themselves. To accomplish this clarification, EPA added a new section to Part 261 providing that any hazardous waste residues in a non-empty container or inner liner are subject to full regulation under the hazardous waste management system (40 CFR §261.7, 45 Fed. Reg. 78529). 40 CFR §261.7(b)(3) defines a container or inner liner which held an acutely hazardous commercial chemical product as empty if it is triple rinsed or similarly decontaminated. The November 25, 1980 regulations also revised 40 CFR §261.33(c) to eliminate reference to containers and inner liners themselves as hazardous wastes.

Thus, the currently effective regulations regard as hazardous wastes any commercial product or off-specification variant thereof listed as an acutely hazardous waste, including residues in non-empty containers and inner liners, which are discarded or intended to be discarded and are generated in quantities greater than one kilogram in any month (or in any quantity by a person who generates more than 1,000 kilograms of other hazardous waste in any month). In addition, residues of the clean-up of spills of acutely hazardous commercial chemical products equal to or greater than 100 kilograms in any month are also regulated as hazardous waste.

D. Special Hazardous Waste Management Rules Applicable to Acutely Hazardous Commercial Chemical Products

EPA's list of acutely hazardous commercial chemical products is a long one, containing almost 200 chemicals. In addition to being products for direct consumption, these chemicals are used to formulate other chemicals and as raw materials in a number of industrial processes. If, by listing a chemical as acutely hazardous, EPA subjected all forms of the chemical as well as any other material containing the chemical to regulation as an acutely hazardous waste, the regulatory effect of the list would border on the unmanageable. Recognizing this potential problem EPA has established a number of specific provisions which further define the regulatory scope of the agency's listing of a commercial chemical product as acutely hazardous.

1. The "Pure Form" Rule

In the preamble to the May 19, 1980 hazardous waste management regulations EPA sought to clarify its intent in establishing lists of commercial chemical products subject to regulation as hazardous wastes when discarded or intended to be discarded. In that regulatory preamble, EPA attempted to make it clear that the listing of a commercial chemical product

rendered only the product itself (when discarded) and not every materia that contained the listed product, a hazardous waste:

> In listing these materials in the proposed rule, EPA intended to encompass those chemical products which possessed toxic or other hazardous properties and which, for various reasons, are sometimes thrown away in pure or undiluted form. The reasons for discarding these materials might be that the materials did not meet required specifications, that inventories were being reduced, or that the product line had changed. The regulation was intended to designate chemicals themselves as hazardous wastes, if discarded, not to list all wastes which might contain these chemical constituents.
> [Emphasis added.]
> [45 Fed. Reg. 33115]

In order to effectuate this intent, EPA added a "Comment" to the section of the May 19, 1980 regulations which included the lists of "acutely hazardous" and "toxic" commercial chemical products. That Comment states:

> The phrase 'commercial chemical product or manufacturing chemical intermediate having the generic name listed in . . .' refers to a chemical substance which is manufactured or formulated for commercial or manufacturing use. It does not refer to a material, such as a manufacturing process waste, that contains any of the substances listed in paragraphs (e) or (f). Where a manufacturing process waste is deemed to be a hazardous waste

> because it contains a substance listed in paragraphs (e) (f), such waste will be listed in either §§261.31 or 261.32 or will be identified as a hazardous waste by the characteristics set forth in Subpart C of this Part.
> [Emphasis added.]
> [45 Fed. Reg. 33124]

While the quoted preamble discussion and regulatory "Comment" represented a clear statement of EPA's intent, some confusion remained, primarily as a result of EPA's use of the undefined term "pure form" in the May 19, 1980 preamble. In promulgating the lists of acutely hazardous and toxic commercial chemical products in final form on November 25, 1980, EPA sought to clarify any misunderstanding of its intent. In the preamble to the final listing, EPA states:

> Questions also have been raised as to the precise meaning of the regulatory language 'having the generic name listed in paragraphs (e) or (f).' The Agency intends that this language include the commercially pure grade of the chemical, any technical grades of the chemical that are produced or marketed, and all formulations in which the chemical is the sole active ingredient.
> [Emphasis added.]
> [45 Fed. Reg. 78538]

To further clarify its intent, EPA also revised the "Comment" to 40 CFR §261.33(d):

> The phrase 'commercial chemical product or manufacturing chemical intermediate having the generic name listed in . . .' refers to a chemical substance which is manufactured or formulated for commercial or manufacturing use which consists of the commercially pure grade of the chemical, any technical grades of the chemical that are produced or marketed, and all formulations in which the chemical is the sole active ingredient. It does not refer to a material, such as a manufacturing process waste, that contains any of the substances listed in paragraphs (e) or (f). Where a manufacturing process waste is deemed to be a hazardous waste because it contains a substance listed in paragraphs (e) or (f), such waste will be listed in either §§261.31 or 261.32 or will be identified as a hazardous waste by the characteristics set forth in Subpart C of this Part.
> [Emphasis added.]
> [45 Fed. Reg. 78541]

Thus, under the currently effective regulations, EPA intends a commercial chemical product to be listed as an acutely hazardous waste only if the product consists of: (1) the commercial grade of the chemical; (2) any technical grade of the chemical; or (3) any chemical formulation in which the listed chemical is the sole active ingredient. If the material in question does not fit within any of these categories it is not a listed hazardous waste. However, as EPA's Comment to 40 CFR §261.33(d) makes clear, waste materials containing a listed

commercial chemical product must, like any other waste, be evaluated against EPA's lists of hazardous process wastes and the four hazardous waste characteristics in order to make a final determination of whether the material is a "hazardous waste" subject to the hazardous waste management regulations.

2. The "Discarded or Intended to be Discarded" Rule

EPA's May 19, 1980 regulations expressly stated that commercial chemical products listed as "acutely hazardous" or "toxic" wastes were subject to regulation as hazardous wastes only when actually "discarded or intended to be discarded" (40 CFR §261.33, 45 Fed. Reg. 33124).

Some confusion was produced by the apparent conflict between the quoted language and the general rule (see 40 CFR §261.6, 45 Fed. Reg. 33120) that listed hazardous wastes which are recycled rather than discarded are regulated to a certain extent (pre-recycle storage and transportation).

Seeking to eliminate any possible confusion, EPA clarified its intent in the preamble to the November 25, 1980 final listing of acutely hazardous and toxic commercial chemical

products by responding directly to the issue of the recycling of listed commercial chemical products:

> B. Are the commercial products and manufacturing chemical intermediates listed in §261.33 subject to regulation if they are used, reused, recycled or reclaimed in lieu of being discarded?
> No. A commercial chemical product or manufacturing chemical intermediate listed in §261.33 is a hazardous waste only if discarded or intended to be discarded. If it continues to be used or sold, it is not being discarded and therefore is not a hazardous waste. If it is an off-specification material and is reprocessed, recycled or reclaimed it is not being discarded and therefore is not a hazardous waste. Thus the provisions of §261.6(b) are not intended to apply to reuses of §261.33 materials, since in such cases the materials are never discarded. The reference in §261.6(b) to wastes "listed in subpart D" is confusing. Wastes listed in §§261.31 and 261.32 are the only wastes intended to be included.
> [Emphasis added.]
> [45 Fed. Reg. 78540]

In the preamble to the related November 25, 1980 clarification of the regulatory status of acutely hazardous commercial chemical product residues in non-empty containers EPA states that the same rule applies to the recycling of such residues:

> If the residue of an acutely hazardous waste listed in §261.33 itself is to be

> beneficially used, re-used, recycled or reclaimed, it is not being discarded and it never becomes a hazardous waste and thus is not subject to the hazardous waste management regulations. [45 Fed. Reg. 78527]

Thus, under the currently effective regulations, acutely hazardous commercial chemical products and residues thereof in non-empty containers are regulated as hazardous wastes only if they are actually discarded or intended to be discarded. Listed commercial chemical products or residues which are beneficially used or re-used or legitimately recycled or reclaimed, or are being accumulated, stored, transported or treated prior to re-use, recycle or reclamation are not regulated.

Keeping these regulatory provisions concerning acutely hazardous commercial chemical products in mind, we proceed to analyze their applicability to the vanadium catalyst in question.

III. The Nature of Vanadium Catalyst and its Use in the Phosphate Fertilizer Industry

The Fertilizer Institute (TFI) has reviewed the factual circumstances surrounding the use of vanadium catalyst in the phosphate fertilizer industry with both the producers and users

of the catalyst. As we understand them, the relevant facts uncovered by TFI's inquiries are as follows.

Sulfuric acid is used in the production of phosphoric acid from phosphate rock. The necessary sulfuric acid is either purchased by the phosphoric acid manufacturer or produced for captive use on or near the phosphoric acid manufacturing site. The sulfuric acid manufacturing process, in turn, involves the use of the vanadium catalyst in question. As stated in a letter dated May 22, 1980 from Mr. A.J. Corey of Monsanto Enviro-Chem Systems, Inc. (a principal manufacturer of the vanadium catalyst) to Mr. Karl T. Johnson of TFI, vanadium pentoxide is one of the raw materials used in the manufacture of the catalyst. A copy of this letter, hereinafter referred to as the "Monsanto letter," is attached.

Vanadium catalyst is shipped to a given sulfuric acid manufacturing site in containers. It is common practice to retain these containers, after the vanadium catalyst is removed, for re-packaging the catalyst once it has become "spent." Although this is a common procedure, catalyst containers are, on occasion, discarded. After a period of time in use vanadium catalyst loses its effectiveness as a result of physical changes

in the catalyst, e.g., the build-up of impurities, and becomes "spent." Spent catalyst is removed from the process to be replaced by fresh catalyst. In most cases, the spent catalyst is re-packaged in catalyst containers and shipped off-site for reclamation. While this is the normal practice, spent vanadium catalyst may, on occasion, be discarded.

IV. Regulation of Vanadium Catalyst As a Hazardous Waste

Given the facts stated above, is vanadium catalyst a hazardous waste subject to regulation under EPA's hazardous waste management system and, if so, under what circumstances?

A. Vanadium Catalyst As a "Listed" Hazardous Waste

1. Vanadium Catalyst Is Not a Listed Industrial Process Hazardous Waste

While EPA's lists of "hazardous" industrial process wastes (40 CFR §§261.31 and 261.32) include "spent catalysts" of various types, spent vanadium catalyst for the production of sulfuric acid is not among those so listed. Therefore, spent vanadium catalyst is not a listed "hazardous" process waste.

2. Vanadium Catalyst Is Not a Listed Acutely Hazardous or Toxic Commercial Chemical Product

To otherwise qualify as a listed hazardous waste, vanadium catalyst would have to be a listed acutely hazardous or toxic commercial chemical product. While "vanadium pentoxide," a raw material in the production of vanadium catalyst, is so listed "vanadium catalyst" itself is not. Therefore, under EPA's rules for determining whether a commercial chemical product is a listed acutely hazardous or toxic waste, vanadium catalyst would have to be commercially pure vanadium pentoxide, a technical grade of vanadium pentoxide or a formulation having vanadium pentoxide as its sole active ingredient in order to qualify as a listed acutely hazardous commercial chemical product.

It goes without saying that for vanadium catalyst to fall into any of these three categories it would have to actually contain vanadium pentoxide in its free form. While the Monsanto letter acknowledges that vanadium pentoxide is used as a raw material in the production of vanadium catalyst, it also states that "it is quite unlikely that any free vanadium pentoxide exists in the catalyst." The letter cites two supporting references for this statement. If, in fact, no free vanadium

pentoxide exists in vanadium catalyst, it is our opinion that the catalyst could not reasonably be regarded as a commercially pure or technical grade of vanadium pentoxide or a formulation having vanadium pentoxide as its sole active ingredient as those terms are used in EPA's interpretative regulatory comment concerning the meaning of the phrase "commercial chemical product or manufacturing chemical intermediate." Under such circumstances, therefore, vanadium catalyst could not reasonably be regarded as "vanadium pentoxide," a listed acutely hazardous commercial chemical product.

Even assuming that vanadium catalyst contained free vanadium pentoxide, it is clear from the Monsanto letter that the catalyst, containing as it does significant quantities of intentionally added chemicals other than vanadium pentoxide, is not "commercially pure" vanadium pentoxide. Nor, given the facts set forth in the Monsanto letter, could vanadium catalyst be reasonably termed a "commercial grade" of vanadium pentoxide. Thus, to be a listed acutely hazardous commercial chemical product, vanadium catalyst, even if it did contain free vanadium pentoxide, would have to be a formulation containing vanadium pentoxide as its <u>sole</u> active ingredient. The Monsanto letter

specifically states that:

> Vanadium is not the only active ingredient in sulfuric acid catalyst. Of equal importance to the activity of the catalyst is the presence of salt promoters.

Given these facts, we conclude that it would not be reasonable to consider vanadium catalyst as a listed acutely hazardous commercial chemical product, even if the catalyst contained some free vanadium pentoxide.

3. The Process Waste Versus Commercial Chemical Product Issue

Having reached the conclusion, on the basis of the facts as we understand them, that vanadium catalyst is not a "listed hazardous waste" under EPA's currently effective hazardous waste management regulations, our inquiry into this aspect of the question presented ordinarily would be complete. However, because of the complexities of EPA's hazardous waste regulatory program we believe it would be worthwhile to go further and consider what the regulatory effect would be <u>if</u> vanadium catalyst had been listed or is, in the future, listed as either an acutely hazardous or toxic commercial chemical product.

Under such circumstances, it is our opinion that only "fresh" as opposed to "spent" vanadium catalyst would be affected by any such listing. Under the currently effective regulations, if vanadium catalyst were listed as an acutely hazardous or toxic commercial chemical product, the discarding or holding with intent to discard of "fresh," unused catalyst, residues of "fresh" catalyst in non-empty containers or residues from the clean-up of a spill of "fresh" catalyst would be subject to full regulation (of course, the "small generator" provisions would apply and possibly provide some relief). Even under these circumstances, the accumulation of fresh catalyst for recycle or reclamation (e.g., as residue in containers being held for use in transporting spent catalyst for reclamation) would not be regulated (see 45 Fed. Reg. 78527, November 25, 1980).

Once the catalyst has been used and becomes "spent," however, we conclude that it would no longer be a listed hazardous waste even if vanadium catalyst were listed as an acutely hazardous or toxic commercial chemical product. Rather, spent vanadium catalyst would constitute a "manufacturing process waste" within the meaning of that term as used in EPA's above quoted interpretative regulatory comment and, therefore, a

hazardous waste only if specifically listed in 40 CFR §§261.31 or 261.32 or if it met any of the four characteristics of hazardous waste.

Our conclusion is based on the simple fact that spent vanadium catalyst is a material which has been used in an industrial process and, having become useless to that process, is removed from use. Thus, it is reasonable to conclude that such a material is a waste generated by that process.

It has been suggested that a catalyst does not, by definition, undergo chemical change during process operations. Therefore, a spent catalyst could be considered to be the same "commercial chemical product" it was before use. This interpretation does not appear to accord with the traditionally accepted concept of "industrial process waste" as that concept is embodied in EPA's hazardous waste management regulations. First, there is no indication in either the preamble or body of the regulations that a given material must actually undergo chemical change during industrial process operations before it is regarded as a waste product of those operations. In fact, it appears unlikely that a number of the industrial process wastes

listed by EPA as "hazardous" in 40 CFR §§261.31 and 261.32 undergo significant chemical change in the process of becoming wastes. Furthermore, by listing certain "spent catalysts" as industrial process wastes rather than acutely hazardous or toxic commercial chemical products, EPA's regulations appear to adopt the view that spent catalysts are process wastes and no longer "commercial chemical products."

B. Vanadium Catalyst As an Industrial Process Waste Which Meets the Characteristics of a Hazardous Waste

Although we conclude that vanadium catalyst has not been listed by EPA as either a hazardous industrial process waste or an acutely hazardous or toxic commercial chemical product, this does not fully answer the question of whether or not vanadium catalyst is regulated as a hazardous waste.

All non-listed wastes must be evaluated against the four characteristics of hazardous waste established by the regulations. A waste meeting any of these characteristics is fully regulated. Therefore, before vanadium catalyst, either "fresh" or "spent," is discarded it must be evaluated against the four hazardous waste characteristics, either by means of the test procedures outlined in the regulations or by the

application of the generator's "knowledge of the hazard characteristic of the waste in light of the materials or the process used" (40 CFR §262.11(c)(2), 45 Fed. Reg. 33143). Should vanadium catalyst intended for discard meet any of the hazardous waste characteristics, it must be handled in accord with all applicable provisions of the hazardous waste management regulations.

It is our understanding, as discussed above, that much of the spent vanadium catalyst is recycled or reclaimed. It is important to note that the re-use, recycling or reclamation of spent vanadium catalyst which is a hazardous waste by virtue of meeting any of the hazardous waste characteristics is not currently regulated under EPA's hazardous waste management system by operation of 40 CFR §261.6, 45 Fed. Reg. 33120.

I hope that this analysis of the status of vanadium catalyst under EPA's hazardous waste management regulations will be of assistance. It should be noted that this analysis deals only with the hazardous waste management regulations promulgated by EPA. The status of vanadium catalyst under any hazardous waste management regulations promulgated by a state

in which operations involving the catalyst are undertaken must also be considered in any given case.

If you have any questions concerning this analysis or any other aspect of this matter, please contact me at (202) 789-7682.

Sincerely yours,

McKENNA, CONNER & CUNEO

By: _____
Richard A. Flye

RAF/pw
Attach.

B-6

[illegible] AGENCY

[illegible] Blvd.
[illegible] 60604

REPLY TO ATTENTION OF

5AHSF

OCT 8 1981

Gerald R. Backlund, Plant Manager
American Cyanamid Company
Industrial Chemical Division
P.O. Box 2228
Kalamazoo, MI 49003

Dear Mr. Backlund:

In regards to your letter of September 18, 1981, in which you requested withdrawal of site Notification, we are in agreement with your conclusion that vanadium pentoxide does not qualify as a reportable waste under Section 103(c) of the Comprehensive Environmental Response Compensation and Liability Act of 1980.

We are therefore, returning your original form No. 8900-1 "Notification of Hazardous Waste Site", with our assurance that all information previously obtained from that form has been deleted from our data base.

Should you have any further questions, please feel free to contact me.

Sincerely yours,

B. G. Constantelos

B. G. Constantelos, Deputy Director
Air & Hazardous Materials Division

B-7

EPA

POTENTIAL HAZARDOUS WASTE SITE
FINAL STRATEGY DETERMINATION

REGION	SITE NUMBER
6	TX01023

File this form in the regional Hazardous Waste Log File and submit a copy to: U.S. Environmental Protection Agency; Site Tracking System; Hazardous Waste Enforcement Task Force (EN-335); 401 M St., SW; Washington, DC 20460.

I. SITE IDENTIFICATION

A. SITE NAME	B. STREET	
AMERICAN CYANAMID CO	600 N. JONES	
C. CITY	D. STATE	E. ZIP CODE
FT WORTH	TX	76106

II. FINAL DETERMINATION

Indicate the recommended action(s) and agency(ies) that should be involved by marking 'X' in the appropriate boxes.

RECOMMENDATION	MARK 'X'	ACTION AGENCY			
		EPA	STATE	LOCAL	PRIVATE
A. NO ACTION NEEDED		X			
B. REMEDIAL ACTION NEEDED, BUT NO RESOURCES AVAILABLE (If yes, complete Section III.)					
C. REMEDIAL ACTION (If yes, complete Section IV.)					
D. ENFORCEMENT ACTION (If yes, specify in Part E whether the case will be primarily managed by the EPA or the State and what type of enforcement action is anticipated.)					

E. RATIONALE FOR FINAL STRATEGY DETERMINATION

COMPANY NOTIFIED INCORRECTLY UNDER SUPERFUND. SITE IS AN ACTIVE RCRA FACILITY. REFER FILE TO RCRA

F. IF A CASE DEVELOPMENT PLAN HAS BEEN PREPARED, SPECIFY THE DATE PREPARED (mo., day, & yr.)	G. IF AN ENFORCEMENT CASE HAS BEEN FILED, SPECIFY THE DATE FILED (mo., day, & yr.)

H. PREPARER INFORMATION

1. NAME	2. TELEPHONE NUMBER	3. DATE (mo., day, & yr.)
BONNIE DE VOS	767-4075	10/5/82

III. REMEDIAL ACTIONS TO BE TAKEN WHEN RESOURCES BECOME AVAILABLE

List all remedial actions, such as excavation, removal, etc. to be taken as soon as resources become available. See instructions for a list of Key Words for each of the actions to be used in the spaces below. Provide an estimate of the approximate cost of the remedy.

A. REMEDIAL ACTION	B. ESTIMATED COST	C. REMARKS
	$	
	$	
	$	
	$	
	$	
	$	
	$	
	$	
D. TOTAL ESTIMATED COST	$	

EPA Form T2070-3 (10-79)

Continue On Reverse

IV. REMEDIAL ACTIONS

A. SHORT TERM/EMERGENCY ACTIONS *(On Site and Off-Site)* List all emergency actions taken or planned to bring the site under immediate control, e.g., restrict access, provide alternate water supply, etc. See instructions for a list of Key Words for each of the actions to be used in the spaces below.

1. ACTION	2. ACTION START DATE (mo.,day,&yr)	3. ACTION END DATE (mo.,day,&yr)	4. ACTION AGENCY (EPA, State, Private Party)	5. COST	6. SPECIFY 311 OR OTHER ACTION: INDICATE THE MAGNITUDE OF THE WORK REQUIRED.
				$	
				$	
				$	
				$	
				$	
				$	

B. LONG TERM STRATEGY *(On Site and Off-Site)* List all long term solutions, e.g., excavation, removal, ground water monitoring wells, etc. See instructions for a list of Key Words for each of the actions to be used in the spaces below.

1. ACTION	2. ACTION START DATE (mo.,day,&yr)	3. ACTION END DATE (mo.,day,&yr)	4. ACTION AGENCY (EPA, State Private Party)	5. COST	6. SPECIFY 311 OR OTHER ACTION: INDICATE THE MAGNITUDE OF THE WORK REQUIRED.
				$	
				$	
				$	
				$	
				$	
				$	

C. MANHOURS AND COST BY ACTION AGENCY

1. ACTION AGENCY	2. TOTAL MAN-HOURS FOR REMEDIAL ACTIVITIES	3. TOTAL COST FOR REMEDIAL ACTIVITIES
a. EPA		$
b. STATE		$
c. PRIVATE PARTIES		$
d. OTHER (specify)		$

B-8

TXD008017261

TX 1023

JAN 14 1986

Honorable Phil Gramm
Office of Senator Phil Gramm
515 Rusk
Suite 8632
Houston, Texas 77002

Dear Senator Gramm:

Thank you for your inquiry of December 23, 1985, on behalf of one of your constituents, regarding allegations that toxic materials were buried at the American Cyanamid Chemical Company in Fort Worth, Texas. This facility was inspected by the Environmental Protection Agency (EPA) on July 30, 1980. Mr. Author A.E. Berkely was interviewed by EPA representatives in January 1981, after which a formal request for information to American Cyanamid was prepared. Their response to this letter indicated no knowledge of any hazardous materials onsite. In August 1981, the company withdrew its Superfund notification, which had been submitted erroneously based upon inaccurate information on the nature of one of the plant's waste materials. This material did not meet the definition of a hazardous waste under the Resource Conservation and Recovery Act (RCRA), as originally assumed.

The facility closed approximately three years ago and voluntarily removed all wastes during closure. The Texas Water Commission (TWC) witnessed the closure and has data on monitor wells which indicate no contamination has occurred in the groundwater.

Based upon the available information, it is the belief of the EPA and the TWC that there has been no hazardous waste activity at this site. If you should require any further information regarding this facility, please contact the TWC or me.

Sincerely yours,

Myron O. Knudson Jr.

Dick Whittington, P.E.
Regional Administrator

cc: Larry Soward, Executive Director
Texas Water Commission

6H-ES:WASH:JR:12/31/85:Disk #3:Doc #64

	CONCURRENCES							
SYMBOL	6W-ES	6H-E	6H					
SURNAME	POPE	HANNESSCHLAGER	SATTERWHITE					
DATE	1/3/86	1/3/86	1/3/86					

EPA Form 1320-1 (12-70)

OFFICIAL FILE COPY

ADDENDUM C

SITE WATER AND SOIL ANALYSIS

Addendum No.	Date	Description
C-1	8/11/80	EPA - American Cyanamid 7/30/80 Inspection Report prepared by R. L. Hiller. Sample results (4) reported 9/30/80 by W. D. Langley, EPA.
C-2	8/13/80	U.S. Dept. of Labor (OSHA) memorandum prepared by C. M. Freeman Re: site inspection 6/27/89 with surface soil (5) sample results.
C-3	11/6/80	G. Fontenot, EPA/A. W. Hoff, Cyanamid Re: Sample analysis results from 7/30/80 site inspection.
C-4	11/84	Bird Sanctuary Landfill soil sampling for RCRA - E.P. Toxicity conducted by American Cyanamid.
C-5	12/85	Site Soil-Gas Survey for Volatile Organics conducted for American Cyanamid.

C-1

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

DATE 11 AUG 1980

SUBJECT American Cyanamid Inspection Report

FROM Robert L. Hiller, Inspector
Compliance Section (6ASASC)

TO Charles Gazda, Chief
Compliance Section (6ASASC)

On July 30, 1980, at 9:30 a.m. Mr. David Anderson of Ecology and Environment and myself went to the American Cyanamid plant at 600 N. Jones in Fort Worth to meet with the following people:

Albert Hoff - Plant Manager (322-2127)
Richard Tabakin - Environmental Coordinator
Gilbert Loudermilk - Plant Safety
George Carlton - Attorney from Maxwell, Bennett, Thomas & Maxwell - Dallas

This inspection was performed as a result of an OSHA referral. OSHA had learned from an anonymous source that there were three burial pits: One was 50' east of the Xero Gel building, the second was 30' north of the first pits, and the third was 100-300' north of the Xero Gel building. They allegedly contained vanadium pentoxide, copper compounds and other chemicals that might have been buried there.

This plant was originally built by the government during WW II. It has since been acquired by American Cyanamid.

The only product it has produced is a crude oil cracking catalyst to remove excess nitrogen and sulphur from the crude. The major raw material is bauxite ore. The process also uses nickel, cobalt, vanadium and molybdenum to impregnate the catalyst for different results. These metals are intended to be spent in the process and not intended to enter the waste stream. Sulfuric acid and nitric acid are also used in the process and are also present in the waste stream. This stream is neutralized with caustic in an underground tank prior to entering ponds. The waste stream (750,000 GPD) also contains a large amount of aluminous sodium sulphate sediment (alumina). There are three 50x75' waste ponds. One is not used. The others are referred to as the North & South Ponds. Process water was being diverted around the South Pond and about 5-6' of sediment was drying for eventual removal. Wind was blowing some dust from the ponds. A simple yard sprinkler could prevent this. A dry sediment sample was taken from the South Pond. Overflow from the North Pond enters the Fort Worth Municipal Collection System. The city has permitted the discharge and routinely checks the quality and quantity of flow. A copy of the city's lab analysis is attached. A liquid sample

the effluent from this pond was also taken during the inspection. The sediment from the ponds is disposed of in a Class I, State permitted landfill in Azle, Texas on F.M. #1886 by Crow & Sons, Inc. (ph. 237-4178). Records showed that in December of 1978 Crow removed 5347 cubic yards. The sediment is removed every 2-3 years.

During heavy rains, (at least 6 times a year) stormwater from the 34 acres of plant property and a large portion from the surrounding part of town gravity flows to an underground tank adjacent to the first one and mixes with a portion of the process water prior to being pumped over the levee and into the Trinity River. A sample of the alumina looking sediment was taken under the discharge pipe. There was no flow from this pipe at the time of the inspection.

Another waste stream from the process is copper and water. This stream is isolated and stored in a ground level tank for removal from the property. It is disposed of by Sonics International of Dallas, (ph. 631-4411), at two deep well disposal sites in Ranger, Texas. Both sites have state permits. Records show that 283,920 gallons were disposed of in 1979 in this manner.

Hydrogen cyanide was made by American Cyanamid until 1955 in California. The cylinders of hydrogen cyanide were distributed to other plants to sell to farmers. No cylinders have been on the American Cyanamid plant in Fort Worth since before 1965. There are no exact records, but no one can recall any cylinders being buried on the site. Previous plant managers were contacted by present management but no one knew of any buried cylinders. Employees working at the plant were interviewed by OSHA and no one recalled any burial of hydrogen cyanide cylinders.

The alumina was used as fill material all over the low areas of the plant property until about 6 years ago. Fifteen or twenty cubic yards are piled about 100' south of the Xero Gel building. A sample of this material was taken for lab analysis.

The inspection was completed about 3:00 p.m. and the samples were delivered to Dick McLaughlin's home for shipment to the Houston EPA lab.

Attachment

cc: Jack Ferguson (6AEWC)

CITY OF FORT WORTH
INDUSTRIAL WASTE SECTION

cc: [illegible]
✓ [illegible] Cyan. #71

SUPPLEMENTARY FOR SURCHARGE RATE

Date 5/2/[illegible]

COMPANY NAME: American Cyan[illegible] #71
ADDRESS: 6[illegible] [illegible]. Jones

Date	H_2O - CF	% H_2O	BOD-ppm	BOD - Wt.	SS-ppm	SS-Wt.
[illegible]/14/[illegible]	5[illegible],[illegible]	[illegible]	11	5.6[illegible]	45	[illegible]
[illegible]/15/[illegible]	54,[illegible]	[illegible].37	[illegible]	4.35	169	[illegible]1.7[illegible]
TOTAL	11[illegible],[illegible]	1[illegible].[illegible]	2[illegible]	1[illegible].03	214	[illegible]
AVERAGE	5[illegible],75[illegible]		10	X / 1[illegible] [illegible]	1[illegible]7	X / [illegible]

PREVIOUS

DATE	H_2O - CF	% H_2O	BOD-ppm	BOD - Wt.	SS-ppm	SS-Wt.
11/[illegible]/7[illegible]	[illegible]3,610	[illegible]	11	5.5[illegible]	2[illegible]	1[illegible].[illegible]
11/[illegible]	51,[illegible]	[illegible]	1[illegible]	7.[illegible]7	[illegible]	1[illegible].71
TOTAL	[illegible]	[illegible]	[illegible]	1[illegible]	[illegible]	[illegible]
AVERAGE	[illegible]		1[illegible]	X / 12 [illegible]	[illegible]	X / [illegible]

CITY OF FORT WORTH
WATER DEPARTMENT
WASTEWATER TREATMENT DIVISION
South Holly
INDUSTRIAL WASTE ANALYSIS SHEET

Sample No. A616 Date Collected 4/14/80

Temperature of Sample: 30 °F

Source: American Cyanamid Address: 600 N. Houston

Time of Collections 10:15AM 9:45AM (XX) Composite ( ) Grab

Method of Preservation: (XX) Refrigeration ( ) Other:

Analysis Requested By: THA Sample Collected By: CDW, JR, JC

These results are in mg/liter of substances indicated and the tests were performed in accordance with Standard Methods, unless noted.

pH 5.5	Arsenic
Chlorides as Cl	Cadmium
	Chromium
Total Suspended Solids 45	Copper
Volatile Tot. Suspended Solids 36.6 %	Iron
	Manganese
	Mercury
B.O.D., 5-day @ 20°C 11	Nickel
T.O.C. 50	Lead
	Zinc
Freon Solubles 31	
COD 30	

Analyst BP, CDW Analyst

V.C. Lab
American Cyanamid
VO/11/76

Date Reported:

CITY OF FORT WORTH
WATER DEPARTMENT
WASTEWATER TREATMENT DIVISION
South Holly
INDUSTRIAL WASTE ANALYSIS SHEET

Sample No. [illegible] Date Collected 4/15/80

Temperature of Sample: 34 °F

Source: American Cyanamid Address: 602 N Jones

Time of Collections 10:15AM 9:45AM (X) Composite ( ) Grab

Method of Preservation: (X) Refrigeration ( ) Other:

Analysis Requested By: TMA Sample Collected By: CJW, JA, CJC

These results are in mg/liter of substances indicated and the tests were performed in accordance with Standard Methods, unless noted.

pH 9.4	Arsenic
Chlorides as Cl	Cadmium
	Chromium
Total Suspended Solids 169	Copper
Volatile Tot. Suspended Solids 42.6 %	Iron
	Manganese
	Mercury
B.O.D., 5-day @ 20°C 9	Nickel
T.O.C. 42	Lead
	Zinc
Freon Solubles	
COD 30	

Analyst JP, CM Analyst

W.C. Lab
American Cyanamid

Date Reported:

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
6608 Hornwood Drive
Houston, Texas 77074

DATE: 3 SEP 1980

SUBJECT: Transmittal of Laboratory Results of American Cyanamid, Fort Worth, Texas

FROM: William D. Langley, Chief,
Laboratory Services Section, 6ASAHL

TO: William J. Librizzi, Director,
Surveillance and Analysis Division, 6ASA

Thru: Malcolm F. Kallus, Chief, Houston Branch, 6ASAH

Transmitted herewith are the results of analyses for selected metals on four samples collected by Mr. Bob Hiller at American Cyanamid, Forth Worth, Texas, on July 30, 1980.

William D. Langley

Attachments: (As Stated)

cc:
Bob Hiller, 6ASASC

EPA Form 1320-6 (Rev. 3-76)

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION VI
1201 ELM STREET
DALLAS, TEXAS 75270

7/30/80
(Date)

RECEIPT FOR SAMPLES

NAME AND TITLE OF EPA REPRESENTATIVE: Bob Hiller
Civil Engineer
(Signature)

SAMPLES COLLECTED:

SAMPLE NUMBER	TIME	PLACE COLLECTED	TYPE	VOLUME	SPLIT SAMPLE REQUESTED	SPLIT SAMPLE PROVIDED
1	1330	North Pond near discharge	liquid	4ℓ	✓	✓
2	1340	South Pond	solid	1 lb	✓	✓
3	1410	River at discharge	solid	1 lb	✓	—
		Paint waste pit ~~Phosphogypsum~~ pit				
4	1440		solid	1 lb	✓	✓

ACKNOWLEDGEMENT OF FACILITY REPRESENTATIVE

The undersigned acknowledges that the samples described above have been collected.

NAME, TITLE AND ADDRESS OF FACILITY REPRESENTATIVE:
American Cyanamid Co.
Authorized Signature
(Signature)

7-30-80
(Date)

DISTRIBUTION: One copy facility representative
One copy for inspector's records
Original to Regional Office

ANALYSIS REQUEST / REPORT

LABORATORY SECTION - HOL ON BRANCH

S. AND A. DIVISION - REGION VI - U.S.E.P.A.

1. Laboratory Number	2. Source of sample	3. Permit Number	4. Outfall Number

5. Sample Type	6. Date Collected	7. Time Collected (hrs.)	8. Collected By
	7/20/78		

9. Date Received	10. Time Received (hrs.)	11. Received By	12. Report Date

13. Collector's and/or Requestor's Remarks

14. Requestor's Signature

15. LABORATORY DATA

PARAMETER	METHOD USED (STORET NUMBER)	CONCENTRATION FOUND (in mg per liter unless stated otherwise)
		Not analyzed
		< 12.5 "
		< 12.5 "
		< 2 "
		< 2 "
		155 "
		< 2 "
Lead, Pb		< 25 "
Mercury, Hg		< 0.2 "
		"
Nickel, Ni		< 20 "
		< 12.5 "
		< 2.5 "
		"
		< "
		< 2 "

16. Laboratory Remarks

17. Reviewed By

18. Approved By

R6 - 84 (Jan. 1976)

0 152 0000 2561

LABORATORY SECTION - HC[illegible] TON BRANCH
S. AND A. DIVISION - REGION VI - U.S.E.P.A.

1. Laboratory Number	2. Source of sample	3. Permit Number	4. Outfall Number
3230	American Cyanamid [illegible] Ft. Worth, TX	—	—

5. Sample Type	6. Date Collected	7. Time Collected (hrs.)	8. Collected By
Grab (Solid)	7/30/80	1340	Bob Hiller

9. Date Received	10. Time Received (hrs.)	11. Received By	12. Report Date
8/1/80	0900	Langley	9/30/80

13. Collector's and/or Requestor's Remarks

Sample from South Pond (Na_2SO_4 precipitate)
Field Sample #2

14. Requestor's Signature

15. LABORATORY DATA

PARAMETER	METHOD USED (STORET NUMBER)	CONCENTRATION FOUND (in mg per liter unless stated otherwise)
Antimony, Sb		Not Analyzed
Arsenic, As		Not Analyzed
Beryllium, Be		<2.2 mg/kg (ppm)
Cadmium, Cd		<3.5 "
Chromium, Cr		3.5 "
Cobalt, Co		523 "
Copper, Cu		1,220 "
Lead, Pb		15.7 "
Mercury, Hg		0.5 "
Molybdenum, Mo		3,210 "
Nickel, Ni		575 "
Selenium, Se		2.1 "
Silver, Ag		<3.5 "
Thallium, Tl		<2.2 "
Vanadium, V		87.1 "
Zinc, Zn		57.5 "

16. Laboratory Remarks

Note: Matrix problems prevent a successful analyses for antimony and arsenic. All values are reported in units of mg/kg (ppm) [illegible] dry [illegible] [illegible]
[illegible]

17. Reviewed By

18. Approved By [illegible]

RG-54 (Jan. 1976)

0152 0000 2602

ANALYSIS REQUEST/REPORT

LABORATORY SECTION - HO[illegible]ON BRANCH

S. AND A. DIVISION - REGION VI - U.S.E.P.A.

1. Laboratory Number	2. Source of sample	3. Permit Number	4. Outfall Number
3-31	[illegible], TX	----	----

5. Sample Type	6. Date Collected	7. Time Collected (hrs.)	8. Collected By
Grab [illegible]	7/30/80	1410	[illegible]

9. Date Received	10. Time Received (hrs.)	11. Received By	12. Report Date
[illegible]	[illegible]	[illegible]	[illegible]

13. Collector's and/or Requester's Remarks

Sample from river bed at discharge pipe ([illegible] sediment)
Field [illegible] #3-

14. Requestor's Signature

15. LABORATORY DATA

PARAMETER	METHOD USED (STORET NUMBER)	CONCENTRATION FOUND (in mg per liter unless stated otherwise)
Antimony, Sb		Not Analyzed
Arsenic, As		Not Analyzed
Beryllium, Be		< 3.7 mg/kg (ppm)
Cadmium, Cd		< 5.9 "
Chromium, Cr		< 5.9 "
Cobalt, Co		1,765 "
Copper, Cu		66.4 "
Lead, Pb		17.6 "
Mercury, Hg		0.9 "
Molybdenum, Mo		1,265 "
Nickel, Ni		258 "
Selenium, Se		< 3.7 "
Silver, Ag		< 5.9 "
Thallium, Tl		< 3.7 "
Vanadium, V		< 29.4 "
Zinc, Zn		58.9 "

16. Laboratory Remarks

Note: Matrix problems prevented successful analysis for antimony and arsenic. All values are [illegible] [illegible] [illegible] [illegible] [illegible] values expressed [illegible] [illegible]

17. Reviewed By	18. Approved By
	[illegible]

RG - 54 (Jan. 1976)

0152 00000 2503

ANALYSIS REQUEST / REPORT
LABORATORY SECTION - HOUSTON BRANCH
S. AND A. DIVISION - REGION VI - U.S.E.P.A.

1. Laboratory Number	2. Source of sample	3. Permit Number	4. Outfall Number
[illegible]	[illegible]	—	—
5. Sample Type	**6. Date Collected**	**7. Time Collected (hrs.)**	**8. Collected By**
Grab (solid)	7/30/80	1440	Bob Hillier
9. Date Received	**10. Time Received (hrs.)**	**11. Received By**	**12. Report Date**
8/1/80	0900	[illegible]	9/3/80

13. Collector's and/or Requestor's Remarks
Sample from waste pile at pit #3.
Field Sample no. 4

14. Requestor's Signature

15. LABORATORY DATA

PARAMETER	METHOD USED (STORET NUMBER)	CONCENTRATION FOUND (in mg per liter unless stated otherwise)
Antimony, Sb		Not Analyzed
Arsenic, As		Not Analyzed
Beryllium, Be		2.0 mg/kg (ppm)
Cadmium, Cd		<2.7 "
Chromium, Cr		4.1 "
Cobalt, Co		6.8 "
Copper, Cu		271 "
Lead, Pb		8.1 "
Mercury, Hg		<0.1 "
Molybdenum, Mo		6,530 "
Nickel, Ni		12.2 "
Selenium, Se		4.7 "
Silver, Ag		<2.7 "
Thallium, Tl		<1.7 "
Vanadium, V		1,830 "
Zinc, Zn		72.5 "

16. Laboratory Remarks
Note: [illegible] problems [illegible] successful [illegible] analysis for [illegible] antimony and arsenic. All values are reported [illegible] mg/kg (ppm) [illegible] values reported [illegible]

17. Reviewed By

18. Approved By

R6 - 54 (Jan. 1976)

INORGANICS ANALYSIS DATA SHEET
SUMMARY OF STANDARDS[1]

LABORATORY NAME _____ SAMPLE NO. _____

LAB SAMPLE ID NO. _____ QC REPORT NO. _____

TASK 1 (Elements to be identified and measured)

		ug/l			ug/l
1.	Aluminum		10.	Nickel	
2.	Chromium	50	11.	Manganese	50
3.	Barium	1000	12.	Zinc	2000
4.	Beryllium		13.	Boron[2]	750*
5.	Cadmium	10	14.	Vanadium	
6.	Cobalt		15.	Calcium	
7.	Copper	1000	16.	Magnesium	
8.	Iron	300	17.	Sodium	
9.	Lead	50			

TASK 2 (Elements to be identified and measured)

		ug/l			ug/l
1.	Arsenic	50	5.	Mercury	2
2.	Antimony		6.	Tin	
3.	Selenium	10	7.	Silver	50
4.	Thallium				

TASK 3 (Elements to be identified and measured)

1.	Ammonia[3]	0.02 mg/l	4.	Cyanide[5]	5 ug/l
2.	Fluoride	mg/l	5.	pH	5-9
3.	Sulfide[4]	0.207 mg/l	6.	TOC	

COMMENTS:

1. ALL STANDARDS ARE FOR DOMESTIC WATER SUPPLY, WITH THE FOLLOWING EXCEPTIONS:
(IRON) 2. FOR LONG TERM IRRIGATION ON SENSITIVE CROPS
(BORON) 3. FOR FRESHWATER AQUATIC LIFE
(SULFIDE) 4. TOXICITY BASED ESTIMATED PERMISSIBLE CONCENTRATION
(CYANIDE) 5. FOR FRESHWATER AND MARINE AQUATIC LIFE AND WILDLIFE.

SUMMARY OF WATER STANDARDS[1]

LABORATORY NAME _____ SAMPLE NO. _____

LAB SAMPLE ID NO. _____ QC REPORT NO. _____

TASK 1 (Elements to be identified and measured)

		ug/l			ug/l
1.	Aluminum[2]	73	10.	Nickel[2]	1.-
2.	Chromium	50	11.	Manganese	50
3.	Barium	1000	12.	Zinc	2000
4.	Beryllium[2]	4	13.	Boron[3]	750
5.	Cadmium	10	14.	Vanadium[2]	7
6.	Cobalt[2]	.07	15.	Calcium	
7.	Copper	1000	16.	Magnesium	
8.	Iron	300	17.	Sodium	
9.	Lead	50			

TASK 2 (Elements to be identified and measured)

		ug/l			ug/l
1.	Arsenic	50	5.	Mercury	2
2.	Antimony[2]	7	6.	Tin	
3.	Selenium	10	7.	Silver	50
4.	Thallium[2]	1.4			

TASK 3 (Elements to be identified and measured)

1.	Ammonia[4]	0.500	mg/l	4.	Cyanide[5]	0.005 mg/l
2.	Fluoride		mg/l	5.	pH	5-9
3.	Sulfide[2]	0.207	mg/l	6.	TOC	

COMMENTS:

1. ALL STANDARDS ARE FOR DOMESTIC WATER SUPPLY, WITH THE FOLLOWING EXCEPTIONS:
2. TOXICITY BASED ESTIMATED PERMISSIBLE CONCENTRATIONS, BASED ON HEALTH EFFECTS, FROM EPA MULTIMEDIA ENVIRONMENTAL GOALS
3. STANDARD FOR LONG TERM IRRIGATION ON SENSITIVE CROPS
4. PROPOSED AMBIENT STANDARD, BASED ON HEALTH EFFECTS, FROM EPA MULTIMEDIA ENVIRONMENTAL GOALS
5. STANDARD FOR FRESHWATER AND MARINE AQUATIC LIFE AND WILDLIFE

DE
12/24/...

Region 6

ENVIRONMENTAL PROTECTION AGENCY
1201 Elm St, Dallas, TX 75270

CHAIN OF CUSTODY RECORD

Proj. No.:

Project Name: AMERICAN CYANAMIDE

SAMPLERS: (Signature) Robert Hiller [signature]

Sample Type columns: 1. General Inorganics; 2. Metals; 3. Nutrients; 4. Oil & Grease; 5. Phenolics; 6. Cyanide; 7. Organic Characterization; 8. Volatile Organics; 9. General Organics; 10. Tracer; 11. Solids - Inorganics; 12. Solids - Organics; 13. Biol - Inorganics; 14. Biol - Organics; 15. Source Filter; 16. Probe Wash; 17. Impinger Catch; 18. Ambient Filter; 19. Solid Adsorbent; 20. Ambient Impinger; 21. Benthos; 22. Bacteriology; 23. Plankton; 24. Chlorophyll; 25. Pathogenic Bacteria; 26.; 27.; 28.

STA NO	SEQ NO	DATE 1980	TIME	STATION LOCATION	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	NUMBER OF CONTAINERS	Remarks
1	1	7-30	1330	North Pond Near Drain		✓														✓													1	Liquid from ~~Settling~~ pond
2	2	7-30	1340	South Pond Center Pond		✓														✓													1	Na_2SO_4 ppt
3	3	7-30	1410	River at discharge Pt		✓														✓													1	Soil
4	4	7-30	1440	Waste Pile Pit 3		✓														✓													1	alumina & silic

TOTAL NO. OF CONTAINERS:

Relinquished by: (Signature)	Date/Time	Received by: (Signature)	Relinquished by: (Signature)	Date/Time	Received by: (Signature)
[signature] Robert Hiller	7-30-80 1600	[signature] R. McLaughlin			
Relinquished by: (Signature)	**Date/Time**	**Received by: (Signature)**	**Relinquished by: (Signature)**	**Date/Time**	**Received by Courier (Signature)**
Relinquished by Courier (Signature)	**Date/Time**	**Received by Mobile Lab (Signature)**	**Relinquished by Mobile Lab (Signature)**	**Date/Time**	**Received by Courier (Signature)**

Method of Shipment:	Shipped by: (Signature)	Courier from Airport (Signature)	Received for Laboratory by: (Signature)	Date/Time
Central Freight Lines	[signature] R. McLaughlin			

Distribution: Original Accompanies Shipment; Copy to Coordinator Field Files

F- 1

C-2

U.S. Department of Labor
(817) 334-5274

Occupational Safety and Health Administration
Fort Worth Area Office - Fort Worth Federal Center
4900 Hemphill Street - Building 24, Room 145
P. O. Box 6477 - Fort Worth, Texas 76115
Reply to the Attention of:

DATE: August 13, 1980
REPLY TO ATTN OF: 6OSHA

SUBJECT: American Cyanamid

THRU: Mr. Gilbert J. Saulter, Regional Administrator

TO: Mr. Herbert M. Kurtz, ARA-TS

Enclosed is a copy and summary of the analysis of soil samples taken at American Cyanamid. This information has been included on an OSHA Form 90, Referral Form, which may supplement your earlier referral to EPA on this matter. EPA may find the results of interest, especially the results of the soil sample collected from the drainage ditch. There is no basis for citing American Cyanamid as a result of these soil samples.

If there are any questions regarding this matter, please contact this office.

CHARLES M. FREEMAN
Area Director
Fort Worth Area Office

Enclosure

INFO		ACTION
	RA	
	ARA/FSO	X
✓	ARA/TS	
	ARA/TECFAP	
	Mgt. Ofcr.	
	Area Directors	

0152 0000 2609

Referral

1. MOD	2. Rgn	3. Area	Inspection ID / 4. CSHO Number	5. Report Number	6. Referral Date	7. Type of Referral	8. Log Number / Number / Year
	0	2-34-5	C5827	0980	00000150	☒ Health ☐ Safety ☐ Both	001 1FO

9. Establishment Name (Print): American Cyanamid

10. SIC: 2819

11. Special Program:

12. Agency Referred By:
- ☒ OSHA
- ☐ 7(c) (1)
- ☐ 18(b) Plan State
- ☐ State/Local Government
- ☐ Federal Agency

13. Agency Referred To:
- ☐ OSHA
- ☐ 18(b) Plan State
- ☐ State/Local Government
- ☒ Federal Agency EPA

14. Priority:

15. Status: ☐ Enter code*

*Codes for Item 15 (Status)
- Delayed: 1. Denied Entry
- 2. Intermittent Operation
- 3. Lack of Resources
- 4. Other
- Cancelled: 5. Condition Corrected
- 6. Worksite No Longer Exists
- 7. AD Discretion

16. Suspected Standards Violated / 17. Substance Code(s)

	a. Part	Section	Para.	Subpara.	17. Substance Code(s)
a.		.	(	)(	) 0734
b.		.	(	)(	) 2571
c.		.	(	)(	) 1342
d.		.	(	)(	) 1791

18. Employee Contact: (Name, Address, and Phone)

Al Hoff - Plant Manager

Jimmy [illegible] - [illegible] (Alternate) Rep

19. Description of Hazard (Include a description of the hazard, what process it is part of, its duration, location, information on controls and PPE, frequency of exposure, any tests conducted and their results, any symptoms or employee comments relating to the exposure, and any other information which will help in evaluating the severity of the situation.)

Vanadium, Copper, Molybdenum, Nickel, and Lead identified in soil analysis taken on [illegible] around [illegible] and drainage ditch leading from property

U.S. Department of Labor

Occupational Safety & Health Admin.
SAMPLING DATA

8. Establishment: AMERICAN CYANAMID CO.			10. RGN 11. Area: 06245	Inspection ID 12. CSHO No.: C5827 13. Report No.: 09B
14. Person Performing Sampling (Signature): [signature]	CSHO NO.: C5827		15. Sampling Date: 6/27/80	16. Shipping Date: 7/14/80
17. Employee (Name) (address)			21. Exposure Information: a. Number; b. Duration; c. Frequency	
(Phone)	18. Job [illegible]	J/T Code	22. Weather Conditions	23. Photo: Y
19. PPE (Type and Effectiveness)		PPE Code; 20. Eng. Code	24. Pump Checks & Adjustments	

25. Job Description, Operation, Work Location(s), Ventilation and Controls
TOPSOIL SAMPLES TAKEN AROUND XERO GEL BUILDING

Cont'd.

Pump No.

26. Sample Type/Media	SOIL SURFACE	SOIL SURFACE	SOIL SURFACE	SOIL SURFACE	SOIL SURFACE
27. Filter/Tube No.					
28. Sample Submission No.	627-1	627-2	627-3	630-4	630-5
29. Time On					
30. Time Off					
31. Total Time (in Min)					
32. Flow Rate ☐ l/min ☐ cc/min	—	—	—	—	—
33. Volume (in Liters)					
34. Net Sample Weight (in mg)					
35. Lab Sample No. →	F-82909	F-82910	F-82911	F-82912	F-82913
36. Substance & Results → VANADIUM	N.D. * D.L. = 0.00% V	[redacted]	[redacted]	N.D. D.L. = 0.005% V	N.D. D.L. = 0.00% V
COPPER	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Mo	N.D. D.L. = 0.01% Mo	[redacted]	[redacted]	[redacted]	N.D. D.L. = 0.01% Mo
Ni	N.D. D.L. = 0.05% Ni	N.D. D.L. = 0.05% Ni	[redacted]	N.D. D.L. = 0.0% Ni	N.D. D.L. = 0.05% Ni

37. Interferences and IH Comments to Lab
V may be present as the (pent)oxide; Cu as nitrate;

38. Supporting Samples
a. Blanks:
b. Bulks:
c. Other:

39. Analyst's Comments * N.D. means not detected. D.L. means detection limit.
** SEE BULK NOTE
SAMPLE F82911 was also analyzed for Pb [redacted] MCR

SOIL-SAMPLE DATA REVIEW

Sampling data, received 8/1/80 from SLCAL, was reviewed.

	AREA OF SOIL SAMPLE	SUBSTANCES FOUND IN % V	Cu	Mo	Ni	Pb	
27-1	"SOUTH FORTY" DISPOSAL SITE - WEST END	N.D.	0.001	N.D.	N.D.		
27-2	"SOUTH FORTY" DISPOSAL SITE - ALUMINA DUMP SITE	0.02	0.02	0.2	N.D.		
27-3	"SOUTH FORTY" AREA; STREAM BANK SAMPLE - SE of GATE	0.02	0.01	0.2	0.04	0.009	
30-4	SURFACE-SOIL — 50' EAST OF XETROGEL BLDG.	N.D.	0.006	0.04	N.D.		
30-5	SURFACE SOIL - NE OF XETROGEL BLDG	N.D	0.005	N.D	N.D.		

CODE NO. _____ UNIFORM STRAIGHT BILL OF LADING ORIGINAL—NOT NEGOTIABLE

TRAILER NO. _____

STRIPPER _____

LOADER _____

CENTRAL FREIGHT LINES INC

EMPLOYEE OWNED TEXAS INSTITUTION

DATE 7-31 19 80

ORIGINAL TO: U.S. EPA Region 6 (6ASASC) STREET ADDRESS 1201 Elm CITY AND STATE Dallas, TX 75270

DESTINATION: U.S. EPA Houston Branch Lab STREET ADDRESS 6608 Hornwood Drive

CITY: Houston STATE: TX 77074 ROUTE

No. Pkgs	DESCRIPTION OF ARTICLES, SPECIAL MARKS AND EXCEPTIONS	*WEIGHT (Sub. to Cor.)	Class or Rate	Freight
1	Liquid & Soil Samples	20		
	Packed in small foam ice chest with ice			
	TOTAL	Pd by check #1572		Prepaid & paid 16.27

Subject to Section 7 of conditions, if this shipment is to be delivered to the consignee without recourse on the consignor, the consignor shall sign the following statement:
The carrier shall not make delivery of this shipment without payment of freight and all other lawful charges.

(Signature of Consignor)

If charges are to be prepaid, write or stamp here "To be Prepaid."

Received $ _____ to apply in prepayment of the charges on the property described hereon.

Agent or Cashier

Per _____
(The signature here acknowledges only the amount prepaid.)

Charges Advanced: $ _____

The Shipment will be forwarded upon unless C.O.D. Amount is filled in here

C.O.D. $ _____

NOTE—Where the rate is dependent on value, shippers are required to state specifically in writing the agreed or declared value of the property. The agreed or declared value of the property is hereby specifically stated by the shipper to be not exceeding _____ per _____

Shipper R. McLaughlin

Per _____

Address U.S. EPA

CENTRAL FREIGHT LINES INC. Dallas

by C.F. Rule 7-31-80

THIS SHIPMENT IS TENDERED AND RECEIVED SUBJECT TO THE TERMS AND CONDITIONS OF THE CARRIERS' BILL OF LADING FILED WITH THE INTERSTATE COMMERCE COMMISSION

NOT NEGOTIABLE

SHIP CENTRAL WITH CONVENIENT CHARGE

C-3

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

NOV 06 1980

Mr. Albert W. Hoff
Plant Manager
American Cyanamid
600 N. Jones Street
Fort Worth, Texas 76106

Dear Mr. Hoff:

Enclosed you will find the results of the analysis of the samples taken during our inspection of your facility on July 30, 1980.

If you have any questions please contact Russell Bartley at the above address or call (214) 767-3274.

Sincerely,

ORIGINAL SIGNED BY

Gerald Fontenot, Chief
Hazardous Materials Enforcement Section, 6AEGH

Enclosure

6AEGH:Bartley:wjw:73274:VI/GBAR301ML1:10-27-80

	CONCURRENCES							
SYMBOL								
SURNAME								
DATE								

EPA Form 1320-1 (12-70)

OFFICIAL FILE COPY

AMERICAN CYANAMID COMPANY

FORT WORTH PLANT

ANALYSIS OF WASTE SAMPLES

PARAMETER (mg/l) Sample No.	NITRIC ACID EXTRACTION			RIVER WATER EXTRACTION		
	2	3	4	2	3	4
Co	523	1.8	6.8	N.F.	N.F.	N.F.
Cu	1220	66.4	271	N.F.	N.F.	N.F.
Pb	15.7	17.6	8.1	N.F.	N.F.	N.F.
Hg	0.5	0.9	-	N.A.	N.A.	N.A.
Mo	3210	1265	6530	30	10	2
Ni	575	258	12.2	N.F.	N.F.	N.F.
V	87.1	-	1830	N.F.	N.F.	N.F.
Zn	57.5	58.9	78.5	N.A.	N.A.	N.A.

Notes: Sample #2 = South Pond Sludge
Sample #3 = River Sediment
Sample #4 = Soils Pile in Bird Sanctuary
N.F. = None Found
N.A. = Not Analyzed

AMERICAN CYANAMID COMPANY

FORT WORTH PLANT

ANALYSIS OF OUTFALL SEDIMENT

AND RIVER WATER BLANK

PARAMETER (mg/l)	RIVER WATER EXTRACTION	DOWNSTREAM RIVER WATER BLANK
Co	N.F.	N.F.
Cu	N.F.	N.F.
Pb	N.F.	N.F.
Hg	N.A.	N.A.
Mo	10	N.F.
Ni	N.F.	N.F.
V	N.F.	N.F.
Zn	N.A.	N.A.

NOTE: N.F. = None Found
N.A. = Not Analyzed

C-4

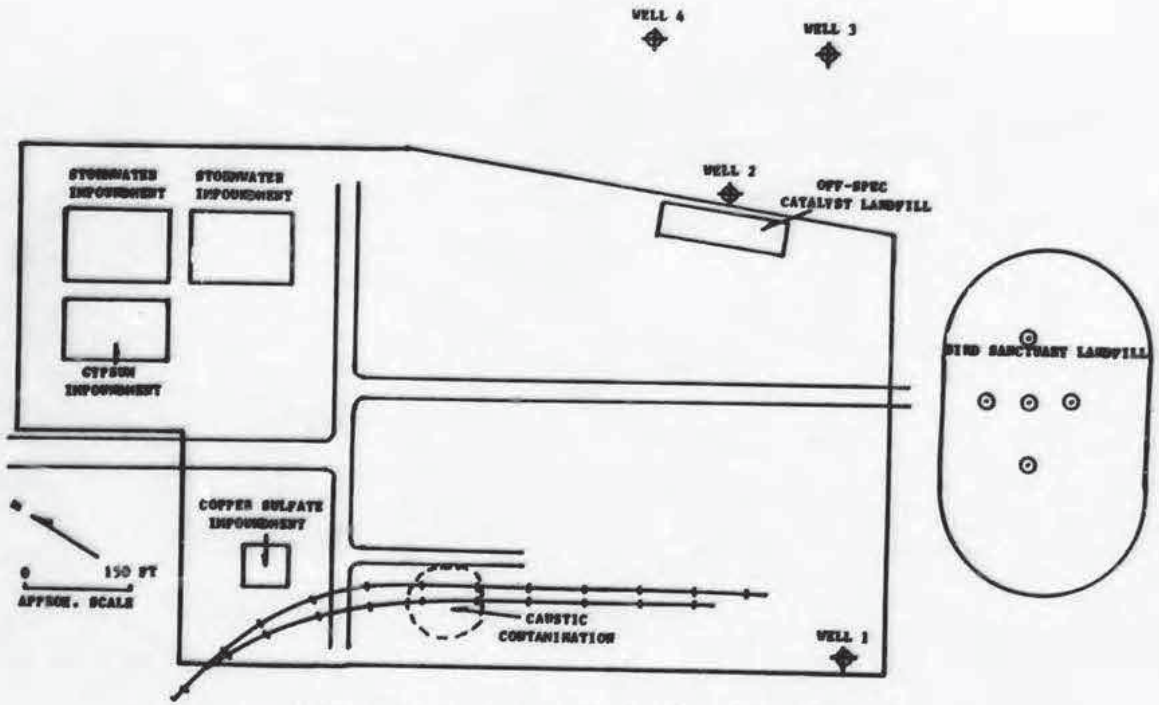
AMERICAN CYANAMID COMPANY
BIRD SANCTUARY LANDFILL SOIL SAMPLING
FOR E.P. TOXICITY
NOVEMBER, 1984

ETC Sample No. and Location*	Depth (inches)	Description
G 0323	0-3	Top soil
Center of Landfill	3-12	Brown clay with white particles
200' S of entrance gate	12-15	Brown clay with white particles
	15-20	More white material
	20-24	Brown clay
	24-35	Brown clay
	35-41	Brown clay
	41	Hit hard ground
G 0324	0-3	Top soil
90 ft. due West	3-5	Brown clay
of Center	5-11	White material
(2/3 of way)	11-20	White and clay
	20-27	Brown clay
	27-28	Reddish clay
	28-37	Reddish clay
	37-41	Brown clay
	41-45	Brown with pieces of white
G 0325	0-3	Top soil
90 ft. due East	3-8	White and clay
of Center	8-12	White
(2/3 way)	12-17	White
	17-24	Brown clay
	24-32	Clay turns reddish
	32-36	Clay and white rock
G 0326	0-2	Top soil and broken glass
60 ft. due South	2-8	Brown clay
of Center	8-11	Brown mixed with white
	11-14	Reddish clay
	14-21	Mostly clay, specs of gray, white, blue
	21-37	Reddish clay
G 0327	0-2	Top soil
60 ft. due North	2-5	Red clay
of Center	5-11	White and gray
	11-19	White, gray and tan
	19-22	White, gray and tan material with rock
G 0328	15-24	Composite soil sample from 15-24" depths.

*See attached figure for approximate sample locations in bird sanctuary landfill and ETC analytical results for RCRA E.P. Toxicity.

May, 1989

0070G/6821J



Approximate locations of samples for EP Toxicity analyses within the Bird Sanctuary landfill on the American Cyanamid Company Fort Worth plant site (open circles with dot in center).

Introduction

This report contains the analytical results on your soil sample, S200S 84/12/03. It is designed to include comprehensive data from the entire analytical process in order to satisfy the needs of various levels of review.

The results obtained from your sample are presented in tabular format immediately following this introduction. Quality assurance data is tabulated along with the appropriate sample results for verification. Depending on the analyses ordered, the quality assurance data may include results from blank, spiked blank, spiked sample (i.e. matrix spike) and replicate sample as well as results from surrogate compound analyses. Quality assurance data for verification of proper instrument performance is also included where appropriate. The report appendices include the chain of custody record for your sample and, where appropriate, the gas chromatograms and mass spectra.

The procedures used in the analysis of the sample are described in this report's methodology section. All analytical procedures within our laboratory are performed within a strictly enforced Quality Assurance Protocol. A description of this Protocol is included in the report.

Results

Sample results, and associated quality assurance data, are always tabulated in one or more of this report's Quantitative Results Tables. The format of each table varies with the class of analysis.

RCRA Analysis

The RCRA EP Toxicity metals, pesticides and herbicides are listed with their EPA Hazardous Waste numbers. Metals determined to be present at concentrations less than their published MDL's are reported as BMDL (Below Method Detection Limit). Elements not present are reported as ND (Not Detected). Compounds determined by GC/ECD methodology to be present at concentrations below their published MDL's are reported as "<nn" where "nn" is the numeric value of the MDL. Blanks, matrix spikes and replicates are treated in the same manner as for priority pollutants.

ETC ENVIRONMENTAL TESTING and CERTIFICATION

ETC ENVIRONMENTAL TESTING and CERTIFICATION

TABLE 1: QUANTITATIVE RESULTS and QUALITY ASSURANCE DATA

JAN 26, 1985

RCRA EP Toxicity Contaminants (QR42)

Chain of Custody Data Required for ETC Data Management Summary Reports

ETC Sample No.	Company	Facility	Sample Point	Date	Time	Elapsed Hours
G0323	AMERICAN CYANAMID COMPANY	ACYFWSOIL	S200S	841203		

EPA Hazardous Waste Number	Parameter	Sample Concen. mg/l	RCRA Alert Level mg/l	QC Replicate		QC Blank and Spiked Blank			QC Matrix Spike		
				First	Second	Blank Data	Concen. Added	% Recov	Unspiked Sample	Concen. Added	% Recov
004D	Arsenic	<1.00	5								
005D	Barium	<5.00	100								
006D	Cadmium	<.20	1								
007D	Chromium	<1.00	5								
008D	Lead	<1.00	5								
009D	Mercury	<3.00E-03	.20								
010D	Selenium	<.30	1								
011D	Silver	<.20	5								
	Cobalt	.04	*								
	Aluminum	.30	*								
	Copper	<.06	*								
	Molybdenum	.79	*								
	Nickel	.13	*								
	Vanadium	.02	*								

* No alert levels set.

ETC TESTING and CERTIFICATION

JAN 26, 1985

TABLE 1: QUANTITATIVE RESULTS and QUALITY ASSURANCE DATA

RCRA EP Toxicity Contaminants (QR11)

Chain of Custody Data Required for ETC Data Management Summary Reports

ETC Sample No.	Company	Facility	Sample Point	Date	Time	Elapsed Hours
G0323	AMERICAN CYANAMID COMPANY	ACYFWSOIL	S200S	841203		

EPA Hazardous Waste Number	Parameter	Sample Concen. mg/l	RCRA Alert Level mg/l	QC Replicate		QC Blank and Spiked Blank			QC Matrix Spike		
				First mg/l	Second mg/l	Blank Data mg/l	Concen. Added mg/l	% Recov	Unspiked Sample mg/l	Concen. Added mg/l	% Recov
012D	Endrin (GC)	ND	.02	ND	ND	ND	0.02	115	ND	0.02	110
013D	Lindane (GC)	ND	.40	ND	ND	ND	0.016	133	ND	0.016	119
014D	Methoxychlor (GC)	ND	10	ND	ND	ND	0.2	95	ND	0.2	99
015D	Toxaphene (GC)	ND	.50	ND	ND	ND	1.0	63	ND	1.0	60
016D	2,4-D	ND	10	0.33	0.20	ND	0.1	41	0.19	0.1	33
017D	2,4,5-TP (Silvex)	ND	1	0.02	0.01	ND	0.01	100	ND	0.01	119

ETC ENVIRONMENTAL TESTING and CERTIFICATION

JAN 26, 1985

TABLE 1: QUANTITATIVE RESULTS and QUALITY ASSURANCE DATA

RCRA EP Toxicity Contaminants (QR42)

Chain of Custody Data Required for ETC Data Management Summary Report

ETC Sample No.	Company	Facility	Sample Point	Date	Time	Elapsed Hours
G0324	AMERICAN CYANAMID COMPANY	ACYFWSOIL	S200S90W	841203		

EPA Hazardous Waste Number	Parameter	Sample Concen. mg/l	RCRA Alert Level mg/l	QC Replicate		QC Blank and Spiked Blank			QC Matrix Spike		
				First	Second	Blank Data	Concen. Added	% Recov	Unspiked Sample	Concen. Added	% Recov
004D	Arsenic	<1.00	5								
005D	Barium	<5.00	100								
006D	Cadmium	<.20	1								
007D	Chromium	<1.00	5								
008D	Lead	<1.00	5								
009D	Mercury	<3.00E-03	.20								
010D	Selenium	< .30	1								
011D	Silver	<.20	5								
	Cobalt	<.03	*								
	Aluminum	<.10	*								
	Copper	<.06	*								
	Molybdenum	.41	*								
	Nickel	.07	*								
	Vanadium	.05	*								

* no state levels set

ETC ENVIRONMENTAL TESTING and CERTIFICATION

ETC TESTING and CERTIFICATION

JAN 26, 1985

TABLE 1: QUANTITATIVE RESULTS and QUALITY ASSURANCE DATA

RCRA EP Toxicity Contaminants (QR11)

Chain of Custody Data Required for ETC Data Management Summary Reports

ETC Sample No.	Company	Facility	Sample Point	Date	Time	Elapsed Hours
G0324	AMERICAN CYANAMID COMPANY	ACYFWSOIL	S200S90W	841203		

EPA Hazardous Waste Number	Parameter	Sample Concen. mg/l	RCRA Alert Level mg/l	QC Replicate		QC Blank and Spiked Blank			QC Matrix Spike		
				First mg/l	Second mg/l	Blank Data mg/l	Concen. Added mg/l	% Recov	Unspiked Sample mg/l	Concen. Added mg/l	% Reco
012D	Endrin (GC)	ND	.02	ND	ND	ND	0.02	115	ND	0.02	110
013D	Lindane (GC)	ND	.40	ND	ND	ND	0.016	133	ND	0.016	119
014D	Methoxychlor (GC)	ND	10	ND	ND	ND	0.2	95	ND	0.2	99
015D	Toxaphene (GC)	ND	.50	ND	ND	ND	1.0	63	ND	1.0	60
016D	2,4-D	ND	10	0.33	0.20	ND	0.1	41	0.19	0.1	33
017D	2,4,5-TP (Silvex)	ND	1	0.02	0.01	ND	0.01	100	ND	0.01	119

ETC ENVIRONMENTAL TESTING and CERTIFICATION

TABLE 1: QUANTITATIVE RESULTS and QUALITY ASSURANCE DATA

JAN 30, 1985

RCRA EP Toxicity Contaminants (QR42)

Chain of Custody Data Required for ETC Data Management Summary Reports

ETC Sample No.	Company	Facility	Sample Point	Date	Time	Elapsed Hours
G0325	AMERICAN CYANAMID COMPANY	ACYFWSOIL	S200S90E	841203		

EPA Hazardous Waste Number	Parameter	Sample Concen. mg/l	RCRA Alert Level mg/l	QC Replicate		QC Blank and Spiked Blank			QC Matrix Spike		
				First	Second	Blank Data	Concen. Added	% Recov	Unspiked Sample	Concen. Added	% Recov
004D	Arsenic	<1.00	5								
005D	Barium	<5.00	100								
006D	Cadmium	<.20	1								
007D	Chromium	<1.00	5								
008D	Lead	<1.00	5								
009D	Mercury	<3.00E-03	.20								
010D	Selenium	<.30	1								
011D	Silver	<.20	5								
	Cobalt	<.03	*								
	Aluminum	<.10	*								
	Copper	<.06	*								
	Molybdenum	.35	*								
	Nickel	.07	*								
	Vanadium	.12	*								

* No alert levels.

ETC ENVIRONMENTAL TESTING and CERTIFICATION

JAN 26, 1985

TABLE 1: QUANTITATIVE RESULTS and QUALITY ASSURANCE DATA

RCRA EP Toxicity Contaminants (QR11)

Chain of Custody Data Required for ETC Data Management Summary Reports

ETC Sample No.	Company	Facility	Sample Point	Date	Time	Elapsed Hours
G0325	AMERICAN CYANAMID COMPANY	ACYFWSOIL	S200S90E	841203		

EPA Hazardous Waste Number	Parameter	Sample Concen. mg/l	RCRA Alert Level mg/l	QC Replicate		QC Blank and Spiked Blank			QC Matrix Spike		
				First mg/l	Second mg/l	Blank Data mg/l	Concen. Added mg/l	% Recov	Unspiked Sample mg/l	Concen. Added mg/l	% Recov
012D	Endrin (GC)	ND	.02	ND	ND	ND	0.02	115	ND	0.02	110
013D	Lindane (GC)	ND	.40	ND	ND	ND	0.016	133	ND	0.016	119
014D	Methoxychlor (GC)	ND	10	ND	ND	ND	0.2	95	ND	0.2	99
015D	Toxaphene (GC)	ND	.50	ND	ND	ND	1.0	63	ND	1.0	60
016D	2,4-D	ND	10	0.33	0.20	ND	0.1	41	0.19	0.1	33
017D	2,4,5-TP (Silvex)	ND	1	0.02	0.01	ND	0.01	100	ND	0.01	119

ETC ENVIRONMENTAL TESTING and CERTIFICATION

JAN 26, 1985

TABLE 1: QUANTITATIVE RESULTS and QUALITY ASSURANCE DATA

RCRA EP Toxicity Contaminants (QR42)

Chain of Custody Data Required for ETC Data Management Summary Reports

ETC Sample No.	Company	Facility	Sample Point	Date	Time	Elapsed Hours
G0326	AMERICAN CYANAMID COMPANY	ACYFWSOIL	S260S	841203		

EPA Hazardous Waste Number	Parameter	Sample Concen. mg/l	RCRA Alert Level mg/l	QC Replicate		QC Blank and Spiked Blank			QC Matrix Spike		
				First	Second	Blank Data	Concen. Added	% Recov	Unspiked Sample	Concen. Added	% Recov
004D	Arsenic	<1.00	5								
005D	Barium	<5.00	100								
006D	Cadmium	<.20	1								
007D	Chromium	<1.00	5								
008D	Lead	<1.00	5								
009D	Mercury	<3.00E-03	.20								
010D	Selenium	<.30	1								
011D	Silver	<.20	5								
	Cobalt	<.03	*								
	Aluminum	<.10	*								
	Copper	.47	*								
	Molybdenum	.34	*								
	Nickel	.05	*								
	Vanadium	.07	*								

* No alert levels set.

ENVIRONMENTAL

ETC ENVIRONMENTAL TESTING and CERTIFICATION

JAN 26, 1985

TABLE 1: QUANTITATIVE RESULTS and QUALITY ASSURANCE DATA

RCRA EP Toxicity Contaminants (QR11)

Chain of Custody Data Required for ETC Data Management Summary Reports

ETC Sample No.	Company	Facility	Sample Point	Date	Time	Elapsed Hours
G0326	AMERICAN CYANAMID COMPANY	ACYFWSOIL	S260S	841203		

EPA Hazardous Waste Number	Parameter	Sample Concen. mg/l	RCRA Alert Level mg/l	QC Replicate		QC Blank and Spiked Blank			QC Matrix Spike		
				First mg/l	Second mg/l	Blank Qnlt mg/l	Concen. Added mg/l	% Recov	Unspiked Sample mg/l	Concen. Added mg/l	% Recov
012D	Endrin (GC)	ND	.02	ND	ND	ND	0.02	115	ND	0.02	110
013D	Lindane (GC)	ND	.40	ND	ND	ND	0.016	133	ND	0.016	119
014D	Methoxychlor (GC)	ND	10	ND	ND	ND	0.2	95	ND	0.2	99
015D	Toxaphene (GC)	ND	.50	ND	ND	ND	1.0	63	ND	1.0	60
016D	2.4-D	ND	10	0.33	0.20	ND	0.1	41	0.19	0.1	33
017D	2.4.5-TP (Silvex)	ND	1	0.02	0.01	ND	0.01	100	ND	0.01	119

ETC ENVIRONMENTAL TESTING and CERTIFICATION

TABLE 1: QUANTITATIVE RESULTS and QUALITY ASSURANCE DATA

JAN 26, 1985

RCRA EP Toxicity Contaminants (QR42)

Chain of Custody Data Required for ETC Data Management Summary Reports

ETC Sample No.	Company	Facility	Sample Point	Date	Time	Elapsed Hours
G0327	AMERICAN CYANAMID COMPANY	ACYFWSOIL	S140S	841203		

EPA Hazardous Waste Number	Parameter	Sample Concen. mg/l	RCRA Alert Level mg/l	QC Replicate		QC Blank and Spiked Blank			QC Matrix Spike		
				First	Second	Blank Data	Concen. Added	% Recov	Unspiked Sample	Concen. Added	% Recov
004D	Arsenic	<1.00	5								
005D	Barium	<5.00	100								
006D	Cadmium	<.20	1								
007D	Chromium	<1.00	5								
008D	Lead	<1.00	5								
009D	Mercury	<3.00E-03	.20								
010D	Selenium	<.30	1								
011D	Silver	<.20	5								
	Cobalt	.80	*								
	Aluminum	<.10	*								
	Copper	<.06	*								
	Molybdenum	.66	*								
	Nickel	.18	*								
	Vanadium	.04	*								

* No state limits set.

ETC ENVIRONMENTAL TESTING and CERTIFICATION

ETC ENVIRONMENTAL TESTING and CERTIFICATION

JAN 26, 1985

TABLE 1: QUANTITATIVE RESULTS and QUALITY ASSURANCE DATA

RCRA EP Toxicity Contaminants (QR11)

Chain of Custody Data Required for ETC Data Management Summary Reports

ETC Sample No.	Company	Facility	Sample Point	Date	Time	Elapsed Hours
G0327	AMERICAN CYANAMID COMPANY	ACYFWS0IL	S140S	841203		

EPA Hazardous Waste Number	Parameter	Sample Concen. mg/l	RCRA Alert Level mg/l	QC Replicate		QC Blank and Spiked Blank			QC Matrix Spike		
				First mg/l	Second mg/l	Blank Data mg/l	Concen. Added mg/l	% Recov	Unspiked Sample mg/l	Concen. Added mg/l	% Recov
D012	Endrin (GC)	ND	.02	ND	ND	ND	0.02	115	ND	0.02	110
D013	Lindane (GC)	ND	.40	ND	ND	ND	0.016	133	ND	0.016	119
D014	Methoxychlor (GC)	ND	10	ND	ND	ND	0.2	95	ND	0.2	99
D015	Toxaphene (GC)	ND	.50	ND	ND	ND	1.0	63	ND	1.0	60
D016	2,4-D	ND	10	0.33	0.20	ND	0.1	41	0.19	0.1	33
D017	2,4,5-TP (Silvex)	ND	1	0.02	0.01	ND	0.01	100	ND	0.01	119

ETC ENVIRONMENTAL TESTING and CERTIFICATION

TABLE 1: QUANTITATIVE RESULTS and QUALITY ASSURANCE DATA

JAN 26, 1985

RCRA EP Toxicity Contaminants (QR42)

Chain of Custody Data Required for ETC Data Management Summary Reports

ETC Sample No.	Company	Facility	Sample Point	Date	Time	Elapsed Hours
G0328	AMERICAN CYANAMID COMPANY	ACYFWSOIL	SCOMPOSITED	841203		

EPA Hazardous Waste Number	Parameter	Sample Concen. mg/l	RCRA Alert Level mg/l	QC Replicate		QC Blank and Spiked Blank			QC Matrix Spike		
				First	Second	Blank Data	Concen. Added	% Recov	Unspiked Sample	Concen Added	% Recov
004D	Arsenic	<1.00	5								
005D	Barium	<5.00	100								
006D	Cadmium	<.20	1								
007D	Chromium	<1.00	5								
008D	Lead	<1.00	5								
009D	Mercury	<3.00E-03	.20								
010D	Selenium	<.30	1								
011D	Silver	<.20	5								
	Cobalt	.51	*								
	Aluminum	<.10	*								
	Copper	<.06	*								
	Molybdenum	.67	*								
	Nickel	.38	*								
	Vanadium	<.02	*								

* No state levels set

ETC TESTING and CERTIFICATION

JAN 26, 1985

TABLE 1: QUANTITATIVE RESULTS and QUALITY ASSURANCE DATA

RCRA EP Toxicity Contaminants (QR11)

Chain of Custody Data Required for ETC Data Management Summary Reports

G0328 AMERICAN CYANAMID COMPANY ACYFWSOIL SCOMPOSITED 841203

ETC Sample No. | Company | Facility | Sample Point | Date | Time | Elapsed Hours

EPA Hazardous Waste Number	Parameter	Sample Concen. mg/l	RCRA Alert Level mg/l	QC Replicate		QC Blank and Spiked Blank			QC Matrix Spike		
				First mg/l	Second mg/l	Blank Data mg/l	Concen. Added mg/l	% Recov	Unspiked Sample mg/l	Concen. Added mg/l	% Recov
012D	Endrin (GC)	ND	.02	ND	ND	ND	0.02	115	ND	0.02	110
013D	Lindane (GC)	ND	.40	ND	ND	ND	0.016	133	ND	0.016	119
014D	Methoxychlor (GC)	ND	10	ND	ND	ND	0.2	95	ND	0.2	99
015D	Toxaphene (GC)	ND	.50	ND	ND	ND	1.0	63	ND	1.0	60
016D	2,4-D	ND	10	0.33	0.20	ND	0.1	41	0.19	0.1	33
017D	2,4,5-TP (Silvex)	ND	1	0.02	0.01	ND	0.01	100	ND	0.01	119

ETC TESTING AND CERTIFICATION

JAN 26, 1985

TABLE 1: QUANTITATIVE RESULTS and QUALITY ASSURANCE DATA

Ground Water Monitoring - Conventional Analysis Data (QR10)

Chain of Custody Data Required for ETC Data Management Summary Reports

ETC Sample No.	Company	Facility	Sample Point	Date	T	Elapsed Hours
G0323	AMERICAN CYANAMID COMPANY	ACYFWSOIL	S200S	841203		

NPDES Number	Compound	Results: Sample Concen.	Results: MDL								
	Total Organic Halides (TOX)ug/l	<5.00	5								
	Total Organic Halides (TOX)ug/l	5.10	5								
	Total Organic Carbon mg/l	13	1								
	Total Organic Carbon mg/l	14	1								
	Silica mg/l	22.50	.05								

"<" indicates too numerous to count
"CF" indicates confluent growth

ETC ENVIRONMENTAL TESTING and CERTIFICATION

JAN 20, 1985

TABLE 1: QUANTITATIVE RESULTS and QUALITY ASSURANCE DATA

Conventionals Analysis Data (QR12)

Chain of Custody Data Required for ETC Data Management Summary Reports

ETC Sample No.	Company	Facility	Sample Point	Date	Time	Elapsed Hours
G0329	AMERICAN CYANAMID COMPANY	ACYFWSOIL	S200S	841203		

NPDES Number	Compound		Results: Sample Concen.	Results: MDL								
	pH	std	6.50									
	Total Organic Carbon	%	6.67									
	Total Organic Carbon	%	5.60									
	Silica	%	50.60									

ETC ENVIRONMENTAL TESTING and CERTIFICATION

JAN 26, 1985

TABLE 1: QUANTITATIVE RESULTS and QUALITY ASSURANCE DATA

Metals, Cyanide and Phenols - Analysis Data (QR05)

Chain of Custody Data Required for ETC Data Management Summary Reports

ETC Sample No.	Company	Facility	Sample Point	Date	Time	Elapsed Hours
G0329	AMERICAN CYANAMID COMPANY	ACYFWSOIL	S200S	841203		

NPDES Number	Compound	Results: Sample Concen. mg/kg	Results: MDL mg/kg								
6M	Copper	89	1								
9M	Nickel	870	1								
	Aluminum	58000	7								
	Cobalt	400	3								
	Molybdenum	5700	1								
	Vanadium	160	1								

* Heavy interferences noted in this sample.

JAN 26, 1985

TABLE 1: QUANTITATIVE RESULTS and QUALITY ASSURANCE DATA

Ground Water Monitoring - Conventional Analysis Data (QR10)

Chain of Custody Data Required for ETC Data Management Summary Reports

ETC Sample No.	Company	Facility	Sample Point	Date	Time	Elapsed Hours
G0324	AMERICAN CYANAMID COMPANY	ACYFWSOIL	S200S90W	841203		

NPDES Number	Compound	Results: Sample Concen.	Results: MDL
	Total Organic Halides (TOX) ug/l	53	5
	Total Organic Halides (TOX) ug/l	56	5
	Total Organic Carbon mg/l	15	1
	Total Organic Carbon mg/l	15	1
	Silica mg/l	22.50	.05

"<" indicating Too Numerous to Count
"CP" Indicates Confluent Growth

ETC ENVIRONMENTAL TESTING and CERTIFICATION

JAN 20, 1985

TABLE 1: QUANTITATIVE RESULTS and QUALITY ASSURANCE DATA

Conventionals Analysis Data (QR12)

Chain of Custody Data Required for ETC Data Management Summary Reports

ETC Sample No.	Company	Facility	Sample Point	Date	Time	Elapsed Hours
G0330	AMERICAN CYANAMID COMPANY	ACYFWSOIL	S200S90W	841203		

NPDES Number	Compound		Results: Sample Concen.	Results: MDL
	pH	std	7.00	
	Total Organic Carbon	%	5.89	
	Total Organic Carbon	%	4.73	
	Silica	%	49.60	

ETC ENVIRONMENTAL TESTING and CERTIFICATION

JAN 26. 1985

TABLE 1: QUANTITATIVE RESULTS and QUALITY ASSURANCE DATA

Metals, Cyanide and Phenols - Analysis Data (QR05)

Chain of Custody Data Required for ETC Data Management Summary Reports

ETC Sample No.	Company	Facility	Sample Point	Date	Time	Elapsed Hours
G0330	AMERICAN CYANAMID COMPANY	ACYFWSOIL	S200S90W	841203		

NPDES Number	Compound	Results: Sample Concen. mg/kg	Results: MDL mg/kg								
6M	Copper	94	1								
9M	Nickel	71	1								
	Aluminum	30000	7								
	Cobalt	54	3								
	Molybdenum	300	1								
	Vanadium	65	1								

Heavy interference noted in this sample.

ETC ENVIRONMENTAL TESTING and CERTIFICATION

JAN 30, 1985

TABLE 1: QUANTITATIVE RESULTS and QUALITY ASSURANCE DATA

Ground Water Monitoring - Conventional Analysis Data (QR10)

Chain of Custody Data Required for ETC Data Management Summary Reports

ETC Sample No.	Company	Facility	Sample Point	Date	Time	Elapsed Hours
G0325	AMERICAN CYANAMID COMPANY	ACYFWSOIL	S200S90E	041203		

NPDES Number	Compound	Results: Sample Concen.	Results: MDL								
	Total Organic Halides (TOX) ug/l	280	5								
	Total Organic Halides (TOX) ug/l	280	5								
	Total Organic Carbon mg/l	19	1								
	Total Organic Carbon mg/l	19	1								
	Silica mg/l	28.80	.05								

ETC ENVIRONMENTAL TESTING and CERTIFICATION

JAN 20, 1985

TABLE 1: QUANTITATIVE RESULTS and QUALITY ASSURANCE DATA

Conventionals Analysis Data (QR12)

Chain of Custody Data Required for ETC Data Management Summary Reports

ETC Sample No.	Company	Facility	Sample Point	Date	Time	Elapsed Hours
G0331	AMERICAN CYANAMID COMPANY	ACYFWSOIL	S200S90E	841203		

NPDES Number	Compound		Results: Sample Concen.	Results: MDL
	pH	std	6.50	
	Total Organic Carbon	%	3.65	
	Total Organic Carbon	%	4.92	
	Silica	%	53.30	

ETC ENVIRONMENTAL TESTING and CERTIFICATION

JAN 26, 1985

TABLE 1: QUANTITATIVE RESULTS and QUALITY ASSURANCE DATA

Metals, Cyanide and Phenols – Analysis Data (QR05)

Chain of Custody Data Required for ETC Data Management Summary Reports

ETC Sample No.	Company	Facility	Sample Point	Date	Time	Elapsed Hours
G0331	AMERICAN CYANAMID COMPANY	ACYFWSOIL	S200S90E	841203		

NPDES Number	Compound	Results: Sample Concen. mg/kg	Results: MDL mg/kg								
6M	Copper	79	1								
9M	Nickel	37	1								
	Aluminum	34000	7								
	Cobalt	37	3								
	Molybdenum	170	1								
	Vanadium	44	1								

* Heavy interferences noted on this sample.

JAN 26, 1985

TABLE 1: QUANTITATIVE RESULTS and QUALITY ASSURANCE DATA

Ground Water Monitoring - Conventional Analysis Data (QR10)

Chain of Custody Data Required for ETC Data Management Summary Reports

ETC Sample No.	Company	Facility	Sample Point	Date	Time	Elapsed Hours
G0326	AMERICAN CYANAMID COMPANY	ACYFWSOIL	S260S	841203		

NPDES Number	Compound	Results: Sample Concen.	Results: MDL
	Total Organic Halides (TOX) ug/l	18	5
	Total Organic Halides (TOX) ug/l	7.50	5
	Total Organic Carbon mg/l	14	1
	Total Organic Carbon mg/l	13	1
	Silica mg/l	18.80	.05

ETC ENVIRONMENTAL TESTING and CERTIFICATION

JAN 20, 1985

TABLE 1: QUANTITATIVE RESULTS and QUALITY ASSURANCE DATA

Conventionals Analysis Data (QR12)

Chain of Custody Data Required for ETC Data Management Summary Reports

ETC Sample No.	Company	Facility	Sample Point	Date	Time	Elapsed Hours
G0332	AMERICAN CYANAMID COMPANY	ACYFWSOIL	S260S	841203		

NPDES Number	Compound		Results: Sample Concen.	Results: MDL								
	pH	std	7.00									
	Total Organic Carbon	%	6.01									
	Total Organic Carbon	%	3.62									
	Silica	%	54.60									

ETC ENVIRONMENTAL TESTING and CERTIFICATION

JAN 26, 1985

TABLE 1: QUANTITATIVE RESULTS and QUALITY ASSURANCE DATA

Metals, Cyanide and Phenols - Analysis Data (QR05)

Chain of Custody Data Required for ETC Data Management Summary Reports

ETC Sample No.	Company	Facility	Sample Point	Date	Time	Elapsed Hours
G0332	AMERICAN CYANAMID COMPANY	ACYFWSOIL	S260S	841203		

NPDES Number	Compound	Results: Sample Concen. mg/kg.	Results: MDL mg/kg								
6M	Copper	95	1								
9M	Nickel	95	1								
	Aluminum	34000	7								
	Cobalt	91	3								
	Molybdenum	610	1								
	Vanadium	110	1								

* Heavy interferences noted in this sample.

ETC TESTING and CERTIFICATION

JAN 26, 1985

TABLE 1: QUANTITATIVE RESULTS and QUALITY ASSURANCE DATA

Ground Water Monitoring – Conventional Analysis Data (QR10)

Chain of Custody Data Required for ETC Data Management Summary Reports

ETC Sample No.	Company	Facility	Sample Point	Date	Time	Elapsed Hours
G0327	AMERICAN CYANAMID COMPANY	ACYFWSOIL	S140S	841203		

NPDES Number	Compound	Results: Sample Concen.	Results: MDL								
	Total Organic Halides (TOX) ug/l	28	5								
	Total Organic Halides (TOX) ug/l	25	5								
	Total Organic Carbon mg/l	15	1								
	Total Organic Carbon mg/l	16	1								
	Silica mg/l	18.80	.05								

TNTC Indicates Too Numerous to Count
CF Indicates Confluent Growth

ETC ENVIRONMENTAL TESTING and CERTIFICATION

JAN 20, 1985

TABLE 1: QUANTITATIVE RESULTS and QUALITY ASSURANCE DATA

Conventionals Analysis Data (QR12)

Chain of Custody Data Required for ETC Data Management Summary Reports

ETC Sample No.	Company	Facility	Sample Point	Date	Time	Elapsed Hours
G0333	AMERICAN CYANAMID COMPANY	ACYFWSOIL	S140S	841203		

NPDES Number	Compound		Results: Sample Concen.	Results: MDL								
	pH	std	7.00									
	Total Organic Carbon	%	4.14									
	Total Organic Carbon	%	4.63									
	Silica	%	47.70									

ETC ENVIRONMENTAL TESTING and CERTIFICATION

JAN 26, 1985

TABLE 1: QUANTITATIVE RESULTS and QUALITY ASSURANCE DATA

Metals, Cyanide and Phenols - Analysis Data (QR05)

Chain of Custody Data Required for ETC Data Management Summary Reports

ETC Sample No.	Company	Facility	Sample Point	Date	Time	Elapsed Hours
G0333	AMERICAN CYANAMID COMPANY	ACYFWSOIL	S140S	841203		

NPDES Number	Compound	Results: Sample Concen. mg/kg	Results: MDL mg/kg								
6M	Copper	110	1								
9M	Nickel	300	1								
	Aluminum	49000	7								
	Cobalt	550	3								
	Molybdenum	2600	1								
	Vanadium	74	1								

* Heavy interferences noted in this sample.

ETC TESTING and CERTIFICATION

JAN 26, 1985

TABLE 1: QUANTITATIVE RESULTS and QUALITY ASSURANCE DATA

Ground Water Monitoring - Conventional Analysis Data (QR10)

Chain of Custody Data Required for ETC Data Management Summary Reports

ETC Sample No.	Company	Facility	Sample Point	Date	Time	Elapsed Hours
G0328	AMERICAN CYANAMID COMPANY	ACYFWSOIL	SCOMPOSITED	841203		

NPDES Number	Compound	Results: Sample Concen.	Results: MDL
	Total Organic Halides (TOX) ug/l	19	5
	Total Organic Halides (TOX) ug/l	15	5
	Total Organic Carbon mg/l	17	1
	Total Organic Carbon mg/l	16	1
	Silica mg/l	23.80	.05

"<" indicates Compound Greater

ETC ENVIRONMENTAL TESTING and CERTIFICATION

JAN 20, 1985

TABLE 1: QUANTITATIVE RESULTS and QUALITY ASSURANCE DATA

Conventionals Analysis Data (QR12)

Chain of Custody Data Required for ETC Data Management Summary Reports

ETC Sample No.	Company	Facility	Sample Point	Date	Time	Elapsed Hours
G0334	AMERICAN CYANAMID COMPANY	ACYFWSOIL	SCOMPOSITED	841203		

NPDES Number	Compound		Results: Sample Concen.	Results: MDL								
	pH	std	7.00									
	Total Organic Carbon	%	4.55									
	Total Organic Carbon	%	4.33									
	Silica	%	47.60									

ETC ENVIRONMENTAL TESTING and CERTIFICATION

JAN 26, 1985

TABLE 1: QUANTITATIVE RESULTS and QUALITY ASSURANCE DATA

Metals, Cyanide and Phenols - Analysis Data (QR05)

Chain of Custody Data Required for ETC Data Management Summary Reports

G0334 AMERICAN CYANAMID COMPANY ACYFWSOIL SCOMPOSITED 841203

ETC Sample No. | Company | Facility | Sample Point | Date | Time | Elapsed Hours

NPDES Number	Compound	Results: Sample Concen. mg/kg	Results: MDL mg/kg								
SM	Copper	150	1								
SM	Nickel	230	1								
	Aluminum	50000	7								
	Cobalt	200	3								
	Molybdenum	1700	1								
	Vanadium	120	1								

* Matrix interferences noted in this sample.

ETC ENVIRONMENTAL TESTING and CERTIFICATION

Methodology for EP Toxicity

The methodology employed in the analysis of your sample for EP Toxicity is in accordance with the "Test Methods of Evaluating Solid Wastes," published by USEPA, Office of Water and Wastes Management, (SW-846, Revision B, July 1981). The test procedures measure those properties of a solid waste which determine whether that waste is "hazardous" as defined by Section 3001 of the Resource Conservation and Recovery Act (PL 94-580). The data obtained with these procedures satisfies the requirements of 40 CFR 261, Identification and Listing of Hazardous Waste. The Extraction Procedure (EP) is designed to simulate the leaching a waste will undergo if buried in an improperly designed sanitary landfill. It is a laboratory te in which a representative waste sample is extracted with deionized water. The pH of the extraction is maintained at a value of 5 with acetic acid. The extract obtained from the EP (the "EP Extract") is then analyzed for the compounds of interest. The compounds on the EP Toxicity list are arsenic, barium, cadmium, chromium, lead, mercury, selenium, silver, Endrin, Lindane, Methoxychlor, Toxaphene, 2,4-Dichlorophenoxyacetic acid (2,4-D), and 2,4,5-Trichlorophenoxypropionic acid (2,4,5-TP). If the EP extract contains any one of the above substances in an amount equal to or exceeding the levels specified in 40 CFR 261.24, the waste possesses the characteristic of Extraction Procedure Toxicity and is defined to be a hazardous waste.

The EP Toxicity Procedure consist of 5 steps.

1. Separation Procedure

A waste containing unbound liquid is filtered. If the solid phase is less than 0.5% of the waste, the solid phase is discarded and the filtrate analyzed for trace elements, pesticides, and herbicides (step 5). If a waste contains more than 0.5% solids, the solid phase is extracted and the liquid phase stored for later use.

2. Structural Integrity Procedure/Particle Size Reduction

Prior to extraction, the solid material must either pass through a 9.5 mm (0.375 in.) standard sieve, have a surface area per gram of waste of 3.1 cm^2, or, if it consists of a single piece, be subjected to the Structural Integrity Procedure. The Structural Integrity Procedure is used to demonstrate the ability of the waste to remain intact after disposal. If the waste does not meet one of these conditions it must be ground to pass the 9.5 mm sieve.

3. Extraction of Solid Material

The solid material from step 2 is extracted for 24 hours in an aqueous medium whose pH is maintained at or below 5, using 0.5 N acetic acid. The pH is maintained either automatically or manually. Maintaining a pH of 5 during the entire extraction may be affected by a specified maximum limit on the amount acid to be added to the system.

4. Final Separation of the Extraction from the Remaining Solid

After xtraction, the liquid:solid ratio is adjusted to 20:1. The mixture is filtered. The solid phase is discarded and the liquid phase is added to the filtrate from step 1. This liquid is the EP Extract that is subjected to the evaluation requirements in 40 CFR 261.24.

5. Analysis of EP Extract

Inorganic and organic species are identified and quantified using the appropriate methods described in the "Test Methods for Evaluating Solid Waste," published by USEPA, Office of Water and Wastes Management (SW-846, Revision B, July 1981). Atomic absorption spectrophotometry (AA) is used in the analysis of the metals and gas chromatography in the analysis of the pesticides and herbicides.

Methodology
for
GC Analysis of Herbicides and Pesticides

The methods employed in the analysis of your sample for herbicides and pesticides are established EPA methods taken from the "Manual of Analytical Methods for the Analysis of Pesticides in Humans and Environmental Samples," June, 1980.

The herbicide method can be summarized as follows: A measured volume of sample, approximately 500-1000 ml, to which sodium sulfate has been added, is acidified and extracted with methylene chloride. The methylene chloride extract is evaporated to dryness, and the residue is derivatized with diazomethane and injected into a gas chromatograph equipped with a ^{63}Ni electron capture detector.

The pesticide method can be summarized as follows: A measured volume of sample, approximately 500ml, is extracted with methylene chloride. The extract is dried and concentrated to a final volume of 1ml and injected into a gas chromatograph equipped with a ^{63}Ni electron capture detector.

The GC operating parameters were as follows:

COLUMN

6' x 4 mm glass 1.5% SP-2250 & 1.95% SP-2401
Supelcoport 100/120 mesh

CARRIER FLOW

60 ml/min Argon/Methane

COLUMN OVEN

220° C

INJECTOR TEMPERATURE

225° C

DETECTOR TEMPERATURE

325° C

ETC TESTING and CERTIFICATION

Quality Assurance/Quality Control Procedures (QA/QC)

ETC bases its quality assurance protocols on the following government guidelines:

- "Handbook for Analytical Quality Control in Water and Wastewater Laboratories", EPA-600/4-79-019, March 1979;
- National Enforcement Investigation Center Policies, and Procedures manual; EPA-330/9/79/00-R, October 1979;
- the recommended guidelines for EPA Methods 624 and 625. (Federal Register, December 3, 1979, pp. 69532-69559);
- "Manual of Analytical Methods for the Analysis of Pesticides in Humans and Environmental Samples," EPA 600/8-80-038, June 1980; and
- "Determination of 2,3,7,8-TCDD in Soil and Sediment" EPA, Region VII, Kansas City, September 1983.

However, we have modified our protocols to provide a higher level of QA/QC than the guidelines require. For example, we analyze a higher than required number of quality control samples and we pay especially careful attention to the certification of the "trade secret standard" compounds we use in analysis. Below are listed the key QA/QC elements for the methods we used.

Analysis of Volatile Organic Compounds by Gas Chromatography/Mass Spectrometry

- Each batch of 13 samples consists of 9 customer samples (at a maximum), one blank sample, one spiked blank, one spiked sample and one replicate sample. This amounts to a 30% quality control factor.
- Three surrogate compounds are added to each sample in the batch of 13.
- A blind quality control sample is introduced to the laboratory for analysis on a weekly basis.
- Each GC/MS is checked and retuned if necessary, at the beginning of each day to ensure that its performance on bromofluorobenzene (BFB) meets the EPA criteria.
- A calibration curve for quantitation is prepared using a mixture of Volatile Organic Priority Pollutant "standards" at a minimum of 3 different concentrations and using a mixture of 3 internal standards at a constant concentration.
- The calibration curve is verified with a mixture of priority pollutant standards every day. If the response factors factors vary greater than 10%, the instrument must be recalibrated.

Analysis of Organic Compounds Extracted in Acid or Base/Neutral Solutions by Gas Chromatography/Mass Spectrometry

- Each batch of 20 samples consists of 16 customer samples (at a maximum), one blank sample, one spiked blank (for water matrices), one sample spiked with the priority pollutant standard mixture and a duplicate customer sample. This amounts to a 20% quality control factor.
- Three surrogate compounds are added to each sample in the batch for Base/Neutral analysis.
- Three surrogate compounds are added to each sample in the batch for Acid analysis.
- A blind quality control sample is introduced to the laboratory for analysis on a weekly basis.

- Each GC/MS is checked and retuned, if necessary, at the beginning of each day to ensure that its performance on decafluorotriphenylphosphine (DFTPP) meets the EPA criteria.

- A calibration curve for quantitation is prepared using a mixture of standards composed of either the Organic Acid or Base/Neutral Extractable Compounds at a minimum of 5 concentrations and using 2,2'-difluorobiphenyl as an internal standard.

Analysis of Metals

All Samples

- New standards are prepared for each batch of samples.

- Normal calibration is performed using a blank sample and four standards that have been through the sample preparation procedure. A regression analysis is used to construct the calibration curve.

- All EP Toxicity samples and all samples determined by furnace atomic absorption are calculated by the "method of additions".

- For each sample analysis that requires the use of the "method of additions" technique, a three point calibration is performed using U.S. EPA "Methods for Chemical Analysis of Water and Wastes, 1979". Results are obtained using linear regression analysis. Any regression with a coefficient of correlation below 0.990 is considered suspect, necessitating review of calibration data or sample re-analysis.

- In constructing the normal calibration curves the lowest concentration levels we use are values greater than or equal to 5 times the Instrumental Detection Limit (IDL).

- All calibration standards are analyzed in duplicate, at a minimum.

- Independent reference standards are used to check the accuracy of calibration standards.

- A check standard is analyzed every ten samples to validate the normal calibration curve.

- One customer sample out of every ten is analyzed in triplicate.

Homogeneous Samples (except for Mercury analysis)

Samples are analyzed in batches of 30 or less. For batches in which the sample matrices are homogeneous, the QC program is a minimum of 25% and consists of analyzing:

- 3 sets of triplicate analyses;

- 2 Replicate spikes;

- 1 Independent reference standard;

- 4 Calibration standards (processed using the sample preparation method);

- 4 Calibration standards (without sample preparation); and

- 1 Reagent Blank.

Heterogeneous Samples (except for Mercury analysis)

Samples are analyzed in batches of 30 or less. For batches in which the sample matrices are heterogeneous, the QC program is a minimum of 35% and consists of analyzing:

- 3 sets of triplicate analyses;
- 2 Replicate spikes;
- 1 Replicate independent reference standards;
- 4 Calibration standards (processed using the sample preparation method);
- 1 Procedural Blank;
- 4 Calibration standards (without sample preparation); and
- 1 Reagent Blank.

Analysis of Mercury

To analyze samples for mercury we group them by matrix in batches of 20 or less. Our QC program is a minimum of 30% and consists of analyzing:

- each of the 30 customer samples in duplicate;
- 3 sets of triplicate anaylses;
- 2 Replicate spikes;
- 2 Replicate independent reference standards;
- 10 Calibration standards (processed using the sample preparation method); and
- 2 Procedural Blanks.

Analysis of Pesticides, Herbicides and PCB's by Gas Chromatography

Pesticide, herbicide and PCB samples are grouped in batches of 16 customer samples or less according to the type of analysis to be performed. The QC program for each of these three types of analyses is a minimum of 20% and consists of analyzing:

- 1 procedural blank sample (a reagent blank is analyzed in the case of non-water matrices);
- 1 spiked blank sample (the spiked blank is eliminated in the case of non-water matrices);
- 1 replicate sample;
- 1 replicate spiked sample; and
- 1 known refernece QC sample for at least each 100 samples analyzed.

The instrument is calibrated each run with three standards, and checked every 10 samples.

Analysis of Cyanides, Phenols, Fluoride, Chloride, Nitrate and Nitrite

- All parameters are analyzed using a Technicon Autoanalyzer II GT.
- 3 calibration standards are analyzed at the beginning and end of each batch.
- Each batch (up to 20 samples) consists of analytical reagent blank, one spiked blank, one duplicate and spiked sample every 20 samples, and an EPA known reference sample.

Analysis of Total Organic Carbon (TOC)

TOC samples are analyzed on a daily basis with the number of samples analyzed per day dependent on the request for duplicate or quadruplicate analyses. The quality control program is designed to maintain the appropriate amount of QC and consists of the following elements:

- Daily instrument calibration
- One blank
- Standard recalibration every 10 samples
- Spiked samples at a low and high level
- Every sample is run in duplicate at a minimum

Analysis of Total Organic Halide (TOX)

- Blank reagent water for absolute carbon background must contain less than 5 ug/l of halide (as chloride).
- Using a trichlorophenol standard, the mean adsorption efficiency must be within +/- 15% of the standard value.
- Calibration standards are run every 10 samples.
- Every sample is run in duplicate at a minimum.

Analysis of 2,3,7,8-TCDD (Dioxin) by GC/MS (SIM)

- Each sample is dosed with a known quantity of $^{13}C_{12}$-2,3,7,8-TCDD as internal standard and $^{37}Cl_4$-TCDD as surrogate standard. The action limits for surrogate standard results is +/- 40% of the true value. Samples showing surrogate standard results outside of these limits are reextracted and reanalyzed.
- Two laboratory "method blanks" are run along with each set of 24 or fewer samples. The method blank is also dosed with the internal standard and surrrogate standard.
- At least one per set of 24 samples is run in duplicate to determine intralaboratory precision.
- Qualitative Requirements. The following are met in order to confirm the presence of native 2,3,7,8-TCDD:

  a. Isomer specificity must be demonstrated initially and verified once per 8-hour work shift. The verification consists of injecting a mixture containing TCDD isomers which elute close to 2,3,7,8-TCDD. The 2,3,7,8-TCDD must be separated from interferring isomers, with no more than 25% valley relative to the 2,3,7,8-TCDD peak.

  b. The 320/322 ratio is within the range of 0.67 to 0.87.

  c. Ions 320, 322, and 257 are all present and maximize together the signal to mean noise ratio must be 2.5 to 1 or better for all 3 ions.

  d. The retention time is equal (within 3 seconds) the retention time for the isotopically labeled 2,3,7,8-TCDD.

  e. At least one of the positives can be confirmed by obtaining partial scan spectra from mass 150 to mass 350. The partial scan guidelines are as follows:

  . the 320/324 ratio should be 1.56 +/- 0.16

  . the 257/259 ratio should be 1.03 +/- 0.10

. the 194/196 ratio should be 1.54 +/- 0.15

- One sample is spiked with native 2,3,7,8-TCDD at a level of 1.0 PPB (for soil) for each set of 24 or fewer samples.
- In cases where no native 2,3,7,8-TCDD is detected, the actual detection limit is estimated and reported based on a signal to noise ratio of 2.5 to 1 at ions 320 and 322.
- For each sample, the internal standard is present with at least a 10 to 1 signal to noise ratio for both mass 332 and mass 334. Also, the internal standard 332/334 ratio must be within the range of 0.67 to 0.67.

Subcontractor QA/QC

Each subcontractoer is required to maintain an appropriate level of quality control. To insure this, each subcontractor is required to submit to ETC the quality control data for all analyses it performs. This data is kept on file at ETC. In general, the amount of quality control required is one duplicate sample with one spiked sample for every ten analyses.

Chain-of-Custody

The chain-of-custody procedure is part of our quality assurance protocol. We believe our chain-of-custody record fully complies with the legal requirements of federal, state and local government agencies and of the courts of law. The record covers:

- labeling of sample bottles, packing the Sample Shuttle and transferring the Shuttle under seal to the custody of a shipper;
- outgoing shipping manifests;
- the chain-of-custody form completed by the persons breaking the Shuttle seal, taking the sample, resealing the Shuttle and transferring custody to a shipper;
- incoming shipping manifests;
- breaking the Shuttle's reseal;
- storing each labeled sample bottle in a secured area;
- disposition of each sample to an analyst or technician; and
- the use of the sample in each bottle in a testing procedure appropriate to the intended purpose of the sample.

The record shows for each link in this process:

- the person with custody; and
- the time and date each person accepted or relinquished custody.

ETC ENVIRONMENTAL TESTING and CERTIFICATION

Methodology for Analysis of Metals

AQUEOUS

The determination of metals in aqueous samples is performed according to the methods published by EPA in "Methods for Chemical Analysis of Water and Wastes," EPA-600/4-79-020, March, 1979, and Appendix IV of the Federal Register, December 3, 1979. Arsenic, selenium and thallium are determined by furnace AA; silver, aluminum, barium, beryllium, boron, cadmium, calcium, chromium, copper, cobalt, iron, magnesium, manganese, molybdenum, nickel, lead, sodium, antimony, tin, titanium, vanadium, and zinc are determined by ICP emission spectrometry, except where lower levels of detection are required: in these cases (e.g. lead in groundwater monitoring samples) furnace AA is used. All furnace AA parameters are run by method of standard additions. The determination of mercury is performed by cold vapor AA.

EP TOXICITY

The determination of metals in aqueous EP Toxicity leachates is performed according to the methods published by EPA in "Test Methods for Evaluating Solid Waste" EPA SW-846, July 1982, and Appendix IV of the Federal Register, Dec. 3, 1979. Silver, arsenic, barium, cadmium, chromium, lead and selenium are determined by ICP emission spectrometry. Mercury is determined using cold vapor AA. For leachates that are organic in nature, the analyses are performed according to the methods described under ***OIL/SLUDGE*** below.

SOIL/SEDIMENT

The determination of silver, beryllium, cadmium, chromium, copper, nickel, antimony, lead, and zinc in sediment samples is performed according to methods published by EPA in "Interim Methods for the Sampling and Analysis of Priority Pollutants in Sediments and Fish Tissue", EPA 600/4-81-055, October 1980. Mercury is determined according to the sediment method published by EPA in "Method for Chemical Analysis of Water and Wastes", EPA 600/4-79-020, March 1979. Arsenic, selenium and thallium are determined by furnace AA using nitric acid in a closed decomposition vessel for sample digestion.

OIL/SLUDGE

The determination of silver, aluminum, boron, barium, beryllium, calcium, cadmium, copper, chromium, cobalt, iron, magnesium, manganese, molybdenum, sodium, nickel, lead, antimony, tin, titanium, vanadium, and zinc in sludge/petroleum-based samples is performed by ICP emission spectrometry using a magnesium nitrate dry ashing digestion technique. Arsenic, selenium and thallium are determined by furnace AA using nitric acid in a closed decomposition vessel for sample digestion. Mercury is determined by cold vapor AA using the same digestion technique.

HEXAVALENT CHROMIUM

The determination of dissolved hexavalent chromium in drinking and surface waters is performed according to the methods published by EPA in "Methods for Chemical Analysis of Water and Wastes," EPA-600/4-79-020, March 1983. For domestic and industrial wastes, Method 7195 in "Test Methods for Evaluating Solid Waste," SW-846, USEPA 1982 may also be employed depending upon the matrix and nature of interfering species.

C-5

AMERICAN CYANAMID COMPANY
FORT WORTH, TX PLANT SITE
SOIL-GAS SURVEY FOR VOLATILE ORGANICS
DECEMBER, 1985

A soil-gas survey was conducted for American Cyanamid in December, 1985 as a screen to determine whether volatile organics were present on site. Soil-gas samples were obtained at various locations throughout the plant site as shown on the attache figure. No detectable levels of VOC's were encountered.

SOIL-GAS SURVEY METHODOLOGY

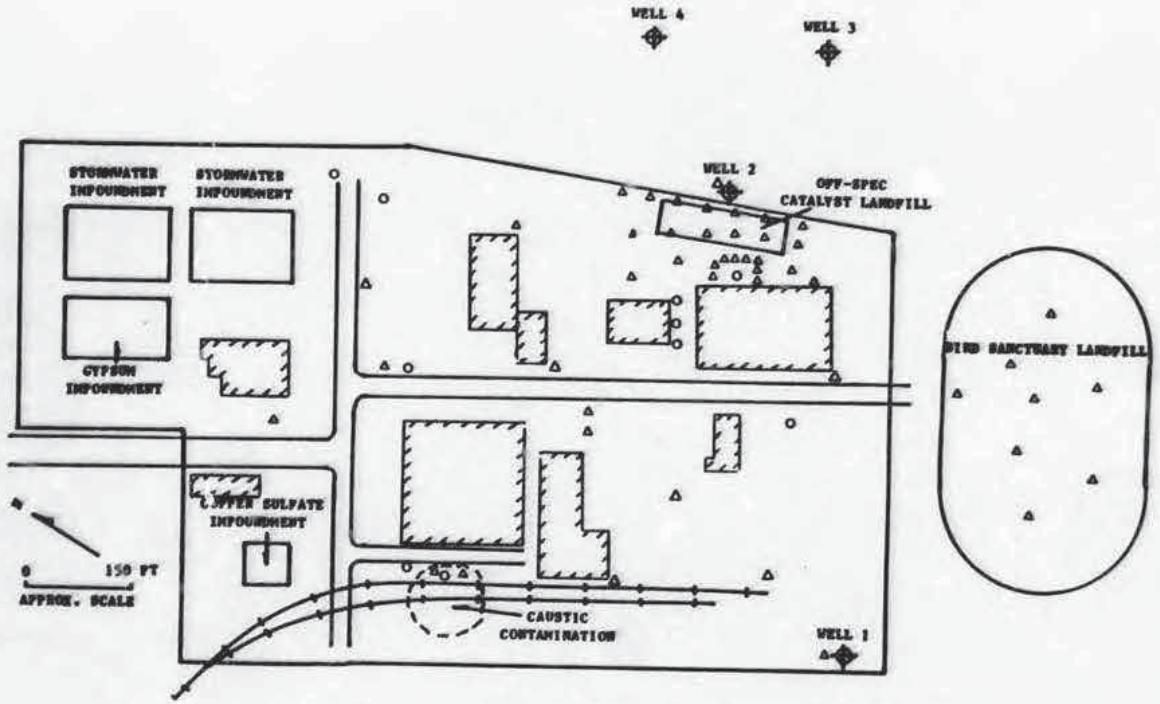
The soil-gas survey consists of a two-phased effort. The first phase provides rapid surveys for the presence of volatile organic chemicals in soil gas in the field with a portable GC having a sensitivity of about 100 ppb. The second phase involves more sensitive laboratory GC/MS analyses of Tenax column traps of soil gas collected at those locations identified as having significant concentrations of organic vapor, so called "hot spots." The second-phase organic analyses have a sensitivity of about 10 ppb.

The soil-gas survey is conducted in the field with a Foxboro Century Model 128 Organic Vapor Analyzer (OVA-128). This instrument is a portable gas chromatograph which can be operated in two modes. The first mode provides a continuous direct readout of total organic vapor concentration which is used in the first-phase survey for hot spots. When used in the first mode, or survey mode, the GC readout is in ppm relative to methane. In the second or GC mode, the OVA-128 traps a specified volume of gas in a sample tube and injects it into a chromatographic column. Any organics present in the soil gas are adsorbed on the column material and are gradually purged by a continuous flow of hydrogen gas. A portable chart recorder prints out a gas chromatogram showing peaks for any volatile organics present in the soil gas. This allows for the tentative identification and semi-quantitative analysis of the individual organics preset while still in the field.

The soil-gas sample is collected by inserting a 0.5-inch OD steel rod into the ground to a depth of from one to three feet. Small holes in the end of the rod allow soil gas to be pumped out of the ground at the rate of about 1.5 to 2.0 liters per minute. The soil gas is then directed either through the OVA-128 or through a Tenax column.

The stainless steel Tenax columns are prepared by taking at 250°C for 12 hours with a nitrogen gas purge. The ends are capped with Swagelok fittings, and each column is stored in an individual sealed glass tube to prevent cross-contamination.

0070G/6821J



Approximate locations of soil-gas sampling stations for volatile organic chemicals (VOCs) on the American Cyanamid Company Fort Worth plant site. No detectable levels of VOCs were encountered. Open triangles mark soil-gas sampling stations, and open circles mark gas sampling stations in ditches, drains and manholes to sewers.

ADDENDUM D

GROUNDWATER MONITORING

Addendum No.	Date	Description
D-1	2/11/82	F. J. Goletz, Cyanamid/A. M. Seils, TWR Re: Preliminary Hydrogeologic Investigation of Inactive Landfill Site dated December, 1981 prepared by Roy F. Weston Inc. for Cyanamid.
D-2	9/10/82	F. J. Goletz, Cyanamid/A. M. Seils, TWR Re: Groundwater Well Monitoring Results.
D-3	5/4/83	F. J. Goletz, Cyanamid/A. M. Siets, TWR Re: Discontinuation of Voluntary Groundwater Well Monitoring Program conducted 9/81 - 4/83.

D-1

CYANAMID

American Cyanamid Company
600 North Jones Street
Fort Worth, Tx 76106
(817) 332-2127

February 11, 1982

Mr. Allan M. Seils
Shipping Control & Effluent Reports Unit
TEXAS DEPARTMENT OF WATER RESOURCES
1700 N. Congress Avenue
P. O. Box 13087, Capitol Station
Austin, Texas 78711

Dear Mr. Seils:

Attached is the report by our consultant, R. F. Weston, Inc. of Houston, Texas, regarding hydrogeologic investigation of an inactive disposal site on our plant property. This study was voluntarily initiated to determine the environmental impact of the vanadium and copper containing wastes known to be disposed of therein.

The results of the study indicate no detectable concentration of vanadium in the upgradient or any of the three downgradient wells; samples were analyzed by R. F. Weston using an atomic adsorption spectrophotometer with a detection limit of 0.03 ml/g. The results do, however, indicate trace copper concentrations, 0.06 and 0.07 mg/l, in two of the downgradient wells; the same analytical procedure and detection limit was used.

These results do not pose any environmental concern. We propose to follow our consultant's recommendation and will sample the wells again this Spring (roughly six months after the initial sampling). We will also take groundwater readings on roughly a quarterly basis. Based on the second round of analysis, which we will forward to your attention, we will recommend any further testing which may be needed.

In the interim, if you have any questions, or wish to discuss this matter further, please contact me at (817) 332-2127.

Yours very truly,

Frank Goletz
Plant Manager

Attachment

WESTON
ENVIRONMENTAL CONSULTANTS-DESIGNERS

PRELIMINARY HYDROGEOLOGIC INVESTIGATION OF AN INACTIVE LANDFILL SITE

AMERICAN CYANAMID COMPANY
FORT WORTH, TEXAS

December 1981

Prepared by:

ROY F. WESTON, INC.
Consultants-Designers
6362 Windswept, Suite 210
Houston, Texas 77057

WESTERN

TABLE OF CONTENTS

PROJECT PARTICIPANTS

Richard C. Johnson
Project Geologist

Kathy L. Kissick
Project Manager

Abraham Thomas, P.G.
Project Director

WESTON

SECTION 1

INTRODUCTION

1.1 LOCATION OF SITE

The American Cyanamid facility is located within the Fort Worth City limits, in the northern part of the city, adjacent to the Trinity River. Geologically, the area rests on critaceous sediments including clays, sands and gravels, and marls.

The eastern side of the plant borders on a flood management area managed by Tarrant County Water Control and Improvement District #1. A levee runs near the plant property parallel to the river which is approximately 700 feet from the plant border. The site is topographically flat at an elevation of approximately 532 feet above sea level. The land slopes toward the river east of the levee.

1.2 BACKGROUND

Two disposal pits have been operated along the eastern side of the plant from the time American Cyanamid purchased the facility in 1946 until approximately 1971. Various off-grade catalysts and process filtrates have been disposed of in these pits. Off-grade Phthalic Anhydride Catalyst is the only defined hazardous waste reported to be buried in these pits. This catalyst is composed of silica substrate impregnated with vanadium pentoxide. Interviews with long-term employees which were conducted by plant personnel indicated that 25 to 50 partially filled drums, possibly containing off-grade Phthalic Anhydride Catalyst were buried in an area to the northeast of the xerogel building. Past aerial photographs indicate both containerized and loose materials in these pits. When the disposal facilities were closed in the early 1970's, the pits were covered with about three feet of sand and topsoil. The bottom of the pit is estimated to be 12 to 15 feet below grade.

NOTE 5/89: Off-grade Phthalic Anhydride Catalyst was incorrectly classified as a hazardous waste with SUPERFUND sites notification subsequently withdrawn. See Addendum B for details.

1.3 PROBLEM DEFINITION

Of the materials known to be contained in the disposal pits, vanadium is the only one listed as a hazardous substance by the Resource Conservation and Recovery Act (RCRA). Under the Comprehensive Environmental Response, Compensation and Liability Act of 1980 (Superfund), American Cyanamid has since notified EPA of the existence of the disposal pits since they are known to contain a hazardous substance. The Superfund notification also required an indication of "known, suspected or likely releases to the environment".

Although no monitoring data is required at the time of notification, it was the desire of the American Cyanamid Company to conduct a hydrogeologic investigation to determine the existing ground water quality and flow directions in areas surrounding the abandoned pits.

1.4 PURPOSE AND SCOPE

As a result, American Cyanamid has engaged Roy F. Weston, Inc. to conduct an investigation of hydrogeologic conditions at the site. The purpose of the investigation was to determine ground-water depth and flow direction at the site and to determine ground-water quality upgradient and downgradient from the covered landfill area. This will enable initial conclusions to be reached concerning the possible impact of the landfill on ground-water quality.

NOTE 5/89: Off-grade Phthalic Anhydride Catalyst was incorrectly classified as a hazardous waste with SUPERFUND sites notification subsequently withdrawn. See Addendum B for details.

WESTON

SECTION 2

FIELD INVESTIGATION

2.1 LOCATION OF MONITORING WELLS

Four monitoring wells were placed in the area of investigation to measure ground-water flow and to sample water quality. The location of the wells is shown on the site plan (Figure 1). Well 1 is located in the western side of the plant, hydrologically upgradient from the covered landfill. Well 2 is located just adjacent, to the east, of the landfill site. Wells 3 and 4 are located roughly midway between the landfill and the river.

Wells 2, 3 and 4 are all hydrologically downgradient from the landfill. Well 1 is a background well and will provide a reference for water quality before it reaches the landfill area.

Because the landfill is near the eastern boundary of the plant grounds, it was impossible to locate downgradient wells on plant property. Wells 2, 3 and 4 were located, therefore, on adjacent property belonging to the Tarrant Company Water District #1. The monitor well installation was done with the full permission of the District. At their request, pole markers were placed around each well to prevent grass cutting machinery and other vehicles from running over the protective well casings that protrude above the ground.

2.2 CONSTRUCTION OF MONITORING WELLS

The wells were drilled using a mud-rotary method and ranged in depth from 40 to 50 feet. Four-inch diameter PVC pipe with 10 feet of slotted screen was used to case the wells. The space around the screens was gravel packed to a level five to 10 feet above the screens. The top of the pack was sealed with two feet of bentonite. The casing sections were connected with machine screens; no chemical adhesive was used. Protective six-inch steel casings were placed at the ground surface and cemented into place.

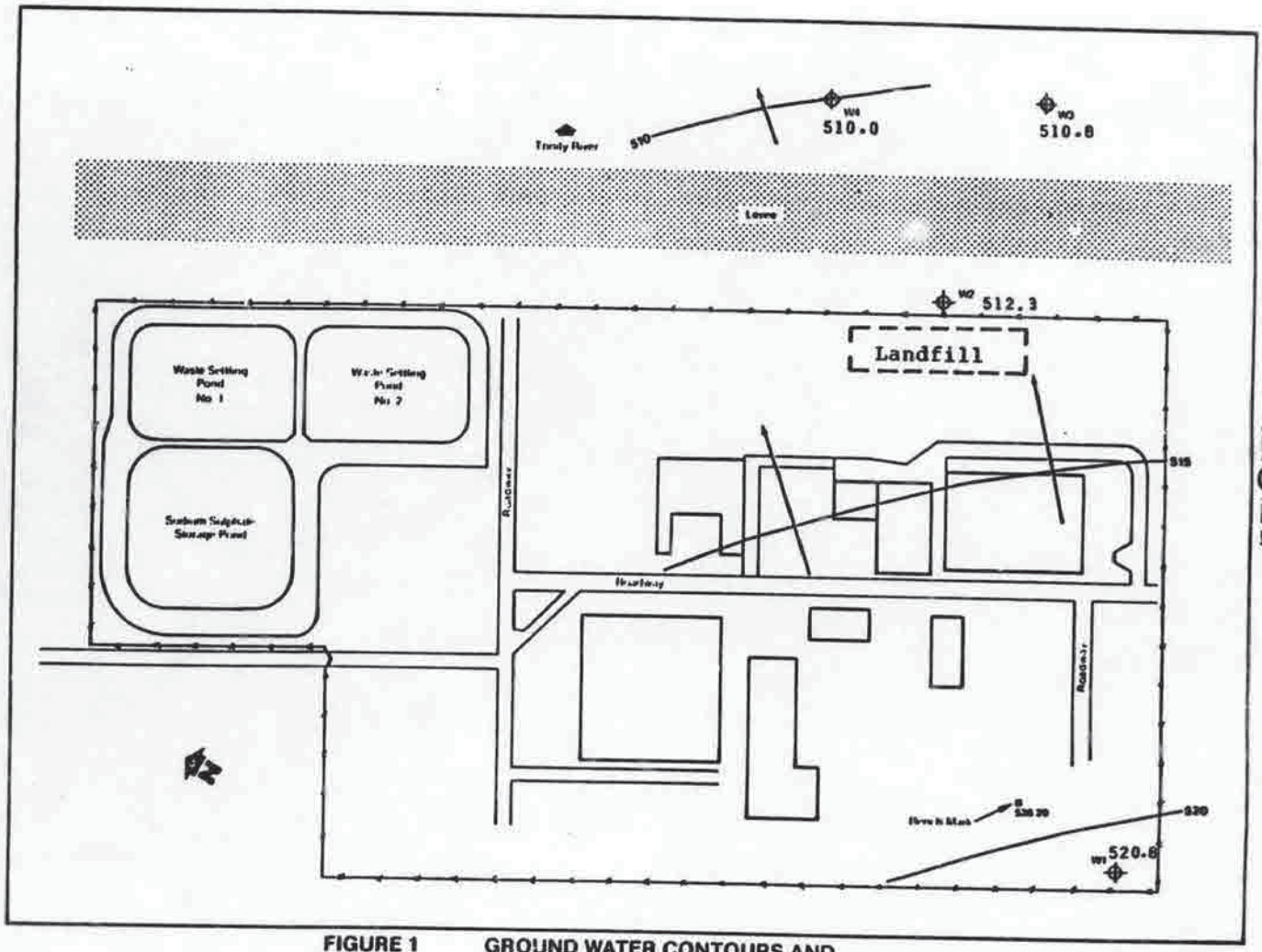


FIGURE 1 **GROUND WATER CONTOURS AND LOCATION OF MONITORING WELLS**

The wet cement also served to seal the wells at the ground surface. Ground and casing elevations were determined for each well in order to reference well water depths. These elevations were tied into a permanent bench mark located on the southwestern area of the plant grounds.

2.3 DESCRIPTION OF SUBSURFACE CONDITIONS

Material encountered at each well consisted of brown clays, sand and gravels and marls. Well logs are presented in the appendix. In general, a brown, cohesive, sandy clay was encountered below the surface, underlain by sandy clay and marls from 25 to 50-foot depths.

2.4 WELL WATER SAMPLING

Each well was pumped with a submersible pump for approximately one hour before sampling. None of the wells were able to retain a constant pump rate of eight to 10 gallons per minute (gpm) that was produced by the pump. When the pumping rate was reduced, Wells 1 and 2 could sustain a flow of approximately three to four gpm and Wells 3 and 4, a flow of approximately one gpm. To clear fine sediments from the wells, the pump was surged, that is, wells were pumped completely down and then allowed to recover before pumping again. Twenty-four hours after the completion of the pumping, clear water samples were taken with a bailer from each well. Sample water was appropriately preserved and shipped immediately by air express to Weston's West Chester, Pennsylvania laboratory.

WESTON

SECTION 3

ANALYSIS OF RESULTS

3.1 GROUND-WATER FLOW

Figure 1 presents a map of the ground-water surface upgradient and downgradient from the landfill. Well water levels ranged from 9.4 to 23.7 feet below ground surface. Ground-water surface elevations are based on well water level measurements made on 12 October 1981. The direction of ground-water flow under the plant site is to the northeast, toward the river.

Because of the relatively low permeability, the overlying clay acts as a partially confining boundary to the more permeable underlying sediments.

Table I presents well water elevations measured between 8 and 16 October. During that period, more than 12 inches of rain fell in the Fort Worth area. The rise in well levels reflects the increased hydraulic load from infiltration through the ground surface and the rise in river level.

3.2 LEVELS OF GROUND-WATER QUALITY TESTS

Each well water sample was tested for pH, specific conductance, total organic carbon (TOC), vanadium and copper. The results of these tests are presented in Table II. The pH results for all samples were neutral (6.9 to 7.0). Vanadium was not present in detectable amounts in any sample. Copper was slightly detectable in Wells 3 and 4 (.06 and .07 ppm respectively).

Specific conductance is significantly higher in Well 2 compared to the background level in Well 1.

In summary, no significant differences were observed between background and downgradient levels of copper and vanadium. However, the relatively higher levels of specific conductance in Well 2 may indicate the presence of constituents not identified in the downgradient wells.

WESTERN

Table I

WELL WATER ELEVATIONS
AMERICAN CYANAMID, FORT WORTH, TEXAS
OCTOBER 1981

Well Number	Elevation of Ground Surface	Water Elevation 10/8	10/12	10/14	10/16
1	532.9	519.6	520.8	523.5	523.5
2	533.8	511.4	512.3	513.2	515.3
3	532.3	510.2	510.8	512.1	514.7
4	532.8	509.1	510.0	512.9	514.1

WESTON

TABLE II

RESULTS OF WATER QUALITY TESTS
AMERICAN CYANAMID, FORT WORTH, TEXAS

Well Number	Date Sampled	pH	Specific Conductance	Cu*	V*	TOC*
1	9/30/81	7.0	1100	<.03	<.05	3.6
2	9/30/81	6.9	3500	<.03	<.05	2.5
3	10/01/81	7.0	1200	.07	<.05	2.5
4	10/01/81	6.9	1900	.06	<.05	2.6

* Unit of measurement = ppm.

WESTON

SECTION 4

CONCLUSIONS AND RECOMMENDATIONS

4.1 CONCLUSIONS

- Ground water beneath the site flows northeast, toward the Trinity River.
- Water levels were 18 to 23 feet below the ground surface by the landfill during the investigation period. The higher level was recorded after a period of very heavy rain. Water in Well 1, on the west side of the plant ranged from 10 to 13 feet below the surface.
- No significant difference in copper or vanadium levels was observed between background Well 1 and Wells 2, 3 and 4 downgradient from the landfill.
- No detectable amounts of vanadium were present in any well samples.
- The specific conductance level recorded in Wells 2 was significantly higher than the background wells.

4.2 RECOMMENDATIONS

Based on the above conclusions, Weston recommends the following follow-up activity:

- Well water level measurements should be made at least quarterly for one year. An informal record of major storms and dry periods before measurements should also be compiled.
- At least one additional round of well water sampling should be done to confirm parameters already tested.

WESTEEN

- The ground-water quality data from the second round of sampling should be evaluated to determine the need for any additional testing.

APPENDIX

DRILLING LOGS

WESTERN

DRILLING LOG

WELL NUMBER: 1
LOCATION: SW corner of plant
SURFACE ELEVATION: 532.87
OWNER: Amer. Cyanamid
ADDRESS: Ft. Worth, TX
TOTAL DEPTH: 40'
WATER LEVEL: 14.4'
DRILLING COMPANY: Watts
DRILLING METHOD: mud/ROT
DATE DRILLED: 9-30-81
DRILLER: J. Watts
HELPER:
LOG BY: R. C.

SKETCH MAP

NOTES:

DEPTH (FEET)	GRAPHIC LOG	SAMPLE NUMBER	SAMPLE TYPE	SAMPLE BLOWS *	DESCRIPTION / SOIL CLASSIFICATION (COLOR, TEXTURE, STRUCTURES)
0					
10					0-24' Brown Cohesive Sandy Clay
					▽ water level
20					
					24'-40' Brown Clay with sand, gravel and marl
30					
					Screen 30'-40'
40					

* A.S.T.M. D1586

SHEET 1 OF 4

WESTON

DRILLING LOG

WELL NUMBER: 2
LOCATION: Near Eastern plant boundary
SURFACE ELEVATION: 533.79
DRILLING COMPANY: Watts
DRILLER: J. Watts
LOG BY: R.C.J.

OWNER: Amer. Cyanmid
ADDRESS: Fort Worth, TX
TOTAL DEPTH 50'
WATER LEVEL: 25'
DRILLING METHOD: mud/ROT
DATE DRILLED: 9-29-81
HELPER:

SKETCH MAP

NOTES:

DEPTH (FEET)	GRAPHIC LOG	SAMPLE NUMBER	SAMPLE TYPE	SAMPLE BLOWS*	DESCRIPTION / SOIL CLASSIFICATION (COLOR, TEXTURE, STRUCTURES)
10					
20					0'-30' Brown Cohesive Clay Soil with Sand and gravel
					▽ water level
30					
					30-50' Brown Clay with marl and sand
40					
50					

* A.S.T.M. D1586

SHEET 2 OF 4

WESTERN

DRILLING LOG

WELL NUMBER: 3
LOCATION: East of levee
SURFACE ELEVATION: 532.3
OWNER: Amer. Cyanamid
ADDRESS: Fort Worth TX
TOTAL DEPTH: 48'
WATER LEVEL: 23.5'
DRILLING COMPANY: Watts
DRILLING METHOD: Mud/ROT
DATE DRILLED: 9-30-81
DRILLER: J. Watts
HELPER:
LOG BY: R.C.J.

SKETCH MAP

NOTES:

DEPTH (FEET)	GRAPHIC LOG	SAMPLE NUMBER	SAMPLE TYPE	SAMPLE BLOWS*	DESCRIPTION / SOIL CLASSIFICATION (COLOR, TEXTURE, STRUCTURES)
10					
20					0'-40' Brown Cohesive sandy clay
					▽ water level
30					
					40'-48' Brown Clay with Sand and Marl
40					
50					

* A.S.T.M. D1586

D-152 0002 2684

WESTON

DRILLING LOG

WELL NUMBER: 4
OWNER: Amer. Cyanamid
LOCATION: East of levee
ADDRESS: Fort Worth TX
TOTAL DEPTH 49'
SURFACE ELEVATION: 532.8
WATER LEVEL: 23.8
DRILLING COMPANY: Watts
DRILLING METHOD: Mud/ROT
DATE DRILLED: 9-30-81
DRILLER:
HELPER:
LOG BY: R.C.J.

SKETCH MAP

NOTES:

DEPTH (FEET)	GRAPHIC LOG	SAMPLE NUMBER	SAMPLE TYPE	SAMPLE BLOWS*	DESCRIPTION / SOIL CLASSIFICATION (COLOR, TEXTURE, STRUCTURES)
10					
20					0-42' Brown Cohesive Sandy Clay
					▽ water level
30					
					42-49 Brown Clay with sand, gravel and marl
40					
50					

* A.S.T.M. D1586

SHEET 4 OF 4

D-2

CYANAMID

American Cyanamid Company
[illegible] North Jones Street
Fort Worth, TX 76106
[illegible] 332-2127

September 10, 1982

Mr. Seils
Texas Department of Water Resources
1700 N. Congress Ave.
Austin, TX 78701

Dear Mr. Seils:

In February of 1982, information was provided to your office concerning a voluntary study initiated by American Cyanamid Co. to determine the environmental impact, if any, of vanadium and copper containing waste in an inactive disposal site on our plant property.

As recommended by our consultant, R. F. Weston, Inc., of Houston, Texas, the wells were again sampled in August 1982. Analyses were conducted by R. F. Weston, Inc. Attached is a table of the results.

The results indicate that trace concentrations of copper and vanadium were found in one of the four wells during this sampling round (i.e., well no. 2). Application of the Student's t-test to the values for vanadium and copper shows the results to be statistically insignificant.

We trust that this information will satisfy your concerns. If you have any questions, or wish to discuss this matter further, contact me at the letterhead address.

Sincerely yours,

Frank J. Goletz
Plant Manager

FJG/pf

Attachment
Bcc: R, Tabakin NA
K. Tsu NA
F. Gruszynski FT

RESULTS OF WATER QUALITY TESTS
AMERICAN CYANAMID CO., FORT WORTH, TEXAS

WELL NUMBER	DATE SAMPLED	pH	SPEC. CONDUCTANCE	Cu*	V*	TOC*
1	8/17/82	7.6	1000	<.01	<.01	6
2	8/17/82	7.6	5600	.08	.04	11
2**	8/17/82	7.7	5700	.07	.04	3
3	8/17/82	7.7	1250	<.01	<.01	3
4	8/17/82	7.7	1700	<.01	<.01	4

*Unit of measurement = ppm
**Duplicate sample

D-3

CYANAMID

American Cyanamid Company
One Cyanamid Plaza
Wayne, NJ 07470

May 4, 1983

Mr. Seils
Texas Department of Water Resources
1700 N. Congress Avenue
Austin, TX 78701

Dear Mr. Seils:

American Cyanamid Company previously initiated a voluntary study to determine the environmental impact, if any, of vanadium and copper containing waste in an inactive disposal area on our plant property (ref. letter; H. J. Mitchell/D. Dutton, 2/22/81). It had been suspected that 25-50 partially filled drums, possibly containing copper and/or vanadium containng substances were buried in this area in 1972.

As recommended by our consultant, R. F. Weston, Inc. of Houston, Texas, four monitoring wells (1 upgradient, 3 downgradient) were constructed and were sampled periodically during the course of this study. The results, tabulated in Table 1, indicate that slight traces of copper and vanadium were found in all the wells, including the upgradient well.

Application of both the Students' t-test at the 99% confidence level and Cochran's Modified t-test at the 95% confidence level have shown that trace quantities of vanadium and copper present are <u>not</u> statistically significant when compared to background data at the upgradient well (Table 2).

Based upon the data collected and the results of the statistical analysis, we do not believe that the inactive disposal area has any adverse environmental impact. We therefore wish to advise you that this monitoring well sampling/analysis program has been terminated.

We trust that this information will satisy your concerns. If you have any questions, or wish to discuss this matter further, contact me at the letterhead address.

Sincerely,

F. J. Goletz
Plant Manager

FJG:RT:sa
6/0009g
Attachments

cc: Mr. D. Ubank
Field Representative
Texas Dept. of Water Resources
203 James Collins Blvd.
Duncanville, TX 75116

Table 1

Results of Water Quality Tests
American Cyanamid Co. - Fort Worth, Texas

Sample Data	Parameter	Upgradient Well #1	Downgradient Well #2	Well #3	Well #4
09/30/81	Copper (mg/l)	.03	.03	.07	.06
08/17/82	Copper	0	.07/.08	0	0
11/15/82	Copper	.09	0/0	.05	0
02/07/82	Copper	0	.03/.03	0	0
04/12/83	Copper	.03	.06/.06	.08	.04
09/30/81	Vanadium (mg/l)	.05	.05	.05	.05
8/17/82	Vanadium	0	.04/.04	0	0
11/15/82	Vanadium	0	0	0	0
02/07/83	Vanadium	0	0	0	0
04/12/83	Vanadium	.02	.07/.07	.03	.04

FJG:RT:sa
6/0009g

Table 2

Results of Statistical Analysis
American Cyanamid Co. - Fort Worth, Texas

	Copper				Vanadium			
	Well 1	Well 2	Well 3	Well 4	Well 1	Well 2	Well 3	Well 4
Mean	0.03	0.04	0.04	0.02	0.01	0.03	0.02	0.02
Standard Deviation	0.04	0.03	0.04	0.03	0.02	0.03	0.02	0.02
Student t @ 99%		0.49	0.39	-0.52		1.039	0.099	0.193
Table t at 99%		2.681	2.896	2.896		2.681	2.896	2.896
Cochran's Modified t		0.45	0.39	-0.52		1.160	0.099	0.193
Table t at 95%		1.842	1.791	1.816		1.765	1.790	1.793

FJG:RT:sa
6/0009g